FOURTH QUARTER 2017 GROUNDWATER ASSESSMENT MONITORING REPORT
DECEMBER 2017 MONITORING EVENT

FORMER ENVIRONMENTAL WASTE SOLUTIONS
CAMDEN CLASS II LANDFILL

TDSWM PERMIT NUMBER IDL 03-0212 (TERMINATED)
200 OMAR CIRCLE
CAMDEN, TN 38320

Prepared for:

THE TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

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CAMDEN CLASS II LANDFILL

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TABLE OF CONTENTS

EXECUTIVE SUMMARY ..... **ii**
GLOSSARY OF TERMS..... **v**

1.0 INTRODUCTION..... **1**
1.1 Site Location 1
1.2 Current Activities 1

2.0 AQUIFER CHARACTERISTICS **2**
2.1 Geologic and Aquifer Characteristics 2
2.1.1 Camden and Harriman Formations 2
2.2 Monitor Well Integrity & Static Water Levels 2
2.3 Groundwater Flow Direction 3
2.4 Potentiometric Gradient 4
2.5 Hydraulic Conductivity 4

3.0 GROUNDWATER SAMPLING PROCEDURES..... **5**
3.1 Instrumentation 5
3.2 Groundwater Purging and Collection of Field Parameter Values 5
3.3 Groundwater Sample Collection & Preservation 7
3.4 Stream and Sediment Sample Collection and Preservation 7
3.4.1 Stream Sampling 8
3.4.2 Sediment Sampling 8
3.5 Quality Assurance and Quality Control 9
3.5.1 Field Quality Assurance and Quality Control 9
3.5.2 Laboratory Quality Assurance and Quality Control 9
3.6 Sample Chain-of-Custody 10

4.0 LABORATORY ANALYTICAL PROCEDURES **11**
4.1 Analytical Methods 11
4.2 Laboratory Analytical Results 12
4.3 Quality Control Qualifier Codes 12

5.0 STATISTICAL ANALYSIS **14**
5.1 Applicable Methods 14
5.2 Statistical Results 15

6.0 CONCLUSIONS **20**
6.1 EWS Groundwater Quality Relative to the EPA Primary Drinking Water Standards 22
6.2 EWS Groundwater Quality Relative to the National Secondary Drinking Water Standards 24

7.0 RECOMMENDATIONS..... **26**

APPENDICES

Appendix A Maps & Tables
Appendix B Statistical Evaluations & Time Series Plots
Appendix C Laboratory Analytical Report & Field Information Logs
Appendix D CEC Standard Operating Procedures

EXECUTIVE SUMMARY

This report documents the fourth quarter 2017 assessment monitoring event which was performed at the former Environmental Waste Solutions, LLC (EWS) Class II Landfill on December 11-14, 2017.

The former EWS Camden Class II landfill was registered with the Tennessee Division of Solid Waste Management (DSWM) with permit number IDL 03-0212. The IDL 03-0212 permit was terminated in July 2017. The former EWS Camden Class II Landfill is located in Benton County at 200 Omar Circle, Camden, Tennessee (latitude 36°03'16" N/longitude -88°05'16" W). Beginning in 2008, the site entered into the Groundwater Detection Monitoring Program, and groundwater samples were collected from site monitoring wells on a semi-annual basis. EWS entered the Assessment Monitoring Program as a result of chloride concentrations reported above the 250 mg/L EPA secondary drinking water standard at monitoring well MW-3 during the November 2015 semi-annual detection monitoring event. As a result, additional groundwater quality assessment activities were completed which included the installation of a new permanent groundwater monitoring well (MW-5), the installation of three (3) temporary monitoring wells, and completion of a private water-use survey. Also, the semi-annual detection monitoring frequency was increased from semi-annual to quarterly assessment monitoring.

Quarterly assessment monitoring activities have been performed since the November 2015 monitoring event in general accordance with the site's Groundwater Quality Assessment Plan (GWQAP) dated March 14, 2016. During the second quarter 2017 assessment monitoring event, total cadmium was detected above the maximum contaminant level (MCL) at MW-3, which was the first MCL exceedance for total cadmium concentrations at any well location on site. As a result, enhancements have been made to the sampling and analytical program for the site. Additional quarterly sampling activities have been added to the sampling and analytical program for the site, which includes the addition of stream and sediment sampling in nearby Charlie Creek and Cane Creek. In addition, the annual storm water sample collected for Sector L National Pollutant Discharge Elimination System (NPDES) compliance now includes the analysis of total cadmium.

On December 11, 2017, during the fourth quarter 2017 assessment-monitoring event, surface water and sediment samples were collected from the Cane Creek and Charlie Creek by Civil & Environmental Consultants, Inc. (CEC). ESC Lab Sciences (ESC) was the chemical laboratory sub-contracted to perform the chemical analyses. The stream sampling activities were completed in accordance with the United States Environmental Protection Agency (USEPA) Science and Ecosystem Support Division (SESD) sampling procedure -SESDPROC-201-R4 titled "Surface Water Sampling". The sediment sampling activities were completed in accordance with the USEPA SESD sampling procedure -SESDPROC-200-R3 titled "Sediment Sampling". Surface water and sediment samples were collected from the stream beginning at the furthest downstream sampling location, moving back upstream, ending with the furthest designated upstream sampling

location. Each surface water sample was collected prior to the collection of a sediment sample at each designated sample location. Surface water and sediment samples were pulled from approximately the same location in the stream. The surface water sample was collected directly into the sample container. The CEC sampler faced upstream, collected the sample without disturbing the bottom sediments and added the laboratory-supplied preservative directly after sample collection. Surface water and sediment samples were collected at the following locations: Charlie Creek Upstream (US), Charlie Creek Midstream (MS), Cane Creek US, Cane Creek MS, and Cane Creek Downstream (DS-1). The stream samples (surface water and sediment) were collected by CEC on December 11, 2017, and ESC performed the chemical analyses. All surface water samples from the stream were analyzed for the Appendix I metals plus aluminum, calcium, iron, magnesium, manganese, potassium, sodium, bromide, chloride, fluoride, and total hardness. In addition, surface water samples from each stream were analyzed for dissolved metals concentrations by placing the water directly into an unpreserved HDPE sample container, which was filtered, by the laboratory before analysis. All sediment samples collected from the stream were analyzed for the same list of parameters as the surface water samples with the exception of total hardness and dissolved metals. The laboratory results for all sample locations are listed in Appendix A: Table 2a & Table 2b. The stream sample locations are shown on Figure 3- "Groundwater and Stream Sample Locations" located in Appendix A.

Groundwater samples were collected by CEC on December 11, 2017 and December 14, 2017. Laboratory reports from the analysis of groundwater samples collected on December 11, 2017 were prepared by ESC and reported to CEC on December 21, 2017. Most of the groundwater wells were sampled for analysis on December 11, 2017 with the exception of MW-3. Proper field stabilization goals could not be achieved at MW-3 on December 11, 2017 using new low-flow sampling techniques. However, MW-3 was sampled for analysis on December 14, 2017 using traditional purge procedures that have been utilized at MW-3 during previous sampling and monitoring events to date. Laboratory reports from the analysis of groundwater samples collected from MW-3 on December 14, 2017 were prepared by ESC and reported to CEC on February 2, 2018.

All permanent groundwater monitoring wells (MWs) and temporary monitoring wells (TMWs) were sampled during the December 2017 event with the exception of MW-2 (MW-2 routinely yields insufficient volumes of water for sampling purposes), which was replaced by MW-4 in April 2013. However, MW-2 remains in place and will continue to be monitored and tested for field parameters (i.e., pH, conductivity, temperature, turbidity, and dissolved oxygen) and water level data. Groundwater samples collected for this sampling event from MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 were analyzed for the Appendix I list of parameters plus aluminum, calcium, iron, magnesium, manganese, potassium, sodium, alkalinity, bromide, chloride, nitrate, sulfate, ammonia, chemical oxygen demand (COD), and boron. In addition, each sample location was analyzed for dissolved metals concentrations by field filtering. A field-filtered metals sample was collected for dissolved metals analysis by field filtering the groundwater using

a new disposable 0.45-micron filter and placing the filtered groundwater into a High Density Polyethylene (HDPE) container preserved with nitric acid (HNO_3).

Since additional waste streams had been approved for disposal in the EWS Class II Landfill after the original Groundwater Monitoring Plan had been approved in 2008, the TDSWM requested that EWS add the volatile organic compounds (VOCs) included in the Appendix I *Constituents for Groundwater Monitoring* presented in Rule 0400-11-01-.04(9)d of the Rules and Regulations Governing Solid Waste Disposal in Tennessee to the existing list of groundwater monitoring constituents. Therefore, EWS began monitoring VOCs at all monitoring well locations starting December 2013.

Leachate samples were also collected by CEC on December 12, 2017 from the "Aluminum Processing Waste Cell (APWC)" and "Industrial Waste Cell (IWC)" locations. The APWC leachate sample was collected from the leachate collection system associated with the aluminum processing waste cell and was collected directly from the associated leachate collection hose before the leachate entered the APWC leachate collection tanks. The IWC leachate sample was collected from the leachate collection system associated with the industrial waste cell and was collected directly from the associated leachate collection hose within the secondary containment area before the leachate entered the IWC leachate collection tank. The approximate APWC and IWC leachate sample locations are shown on Figure 2- Potentiometric Surface Map located in Appendix A.

The reported concentrations of chemicals detected in the groundwater monitoring wells and temporary monitoring wells were reviewed and compared against their respective U.S. EPA Maximum Contaminant Levels (MCLs) and U.S. National Secondary Drinking Water Standards (2DWS). Stream (surface water) samples were reviewed and compared to the upstream sampling results and the *General Water Quality Criteria* established in TDEC Rule Chapter 0400-40.03 of the Rules of the Tennessee Department of Environment and Conservation. Statistical analysis methods were used to identify whether there were any statistically significant increases (SSIs) in any site monitoring wells over background concentrations for the analyzed water quality parameters. Statistical analysis methods were not used to identify any SSIs for the stream (surface water) samples, since previous samples have not been collected at these locations prior to this monitoring event and sample size is very limited at this time. The results of the analyses are summarized in the following paragraphs:

Total cadmium was detected above the MCL (0.005 mg/L) at MW-3 during the December 14, 2017 event (total cadmium at MW-3 = 0.00659 mg/l). Total cadmium was first detected above the MCL at MW-3 during the June 8, 2017 event (total cadmium at MW-3 = 0.0286 mg/l). Another follow-up sampling event was carried out at MW-3 on August 8, 2017 in order to re-sample MW-3 to validate the previously reported cadmium concentrations. The August 8, 2017 re-sample result for total cadmium in MW-3 was 0.0113 mg/l, which was 60% lower than the concentration that was detected during the sampling event on June 8, 2017. During the August 8, 2017 resampling event, MW-3 was allowed to recharge overnight, which yielded a low-turbidity sample.

While the turbidity results on August 8, 2017 were closer to the target recommended goal for turbidity of 10 Nephelometric Turbidity Units (NTUs), the result was still slightly above the recommended goal when sampled (16.6 NTUs). Similarly, the turbidity results on December 14, 2017 (23 NTUs) and September 28, 2017 (18.9 NTUs) at the time of sample collection were slightly above the recommended goal of 10 NTUs. The sampling results from the December 14, 2017 event and the previous September 28, 2017 event revealed that the dissolved cadmium results in the field filtered samples collected at MW-3 were above the MCL and similar to the total cadmium results. The results from the two most recent sampling events has not confirmed a correlation between elevated turbidity and increased cadmium levels observed in the June and August 2017 results in MW-3. The impact of turbidity on sample results will continue to be evaluated during future monitoring events. These results indicate that the cadmium levels seen in previous events may not have been associated with the slightly elevated turbidity in MW-3.

The statistical trend analysis for total cadmium at MW-3 does confirm an increasing trend having statistical significance. In contrast, Wilcoxon statistical group comparisons, comparing background data to MW-3 data, do not draw any firm conclusions as to whether the increase in total cadmium at MW-3 is indicative of a statistically significant increase in concentrations at a confidence level of 1%, perhaps due to the limited number of cadmium detections above the laboratory detection limit of 0.001 mg/l (i.e., limited sample size and associated low Power of the Wilcoxon test for a given effect). Similarly, the statistical trend analysis for total zinc at MW-3 during this December 2017 event (total zinc at MW-3= 0.159 mg/l) confirmed an increasing trend having statistical significance. Zinc was first detected above the laboratory PQL at MW-3 during the June 2017 groundwater event (total zinc=0.0769 mg/l) and was also detected during the September 2017 event (total zinc= 0.0439 mg/l). The PQL, or "Practical Quantification Limit," represents the concentration at which a compound can be quantified within specific limits of precision in the sample. Before June 2017, zinc had remained below the current laboratory PQL of 0.025 mg/l since July of 2010. Although zinc levels are above the PQL, the levels are still well below the secondary drinking water standard of 5 mg/L.

Total lead was detected in TMW-1 and TMW-2 at concentrations that exceeded the EPA MCLs. The MCL exceedances at TMW-1 and TMW-2 were likely affected by the elevated turbidity at TMW-1 (315 NTU) and TMW-2 (>1000 NTU) at the time of sampling. TMW-1, TMW-2, and TMW-3 were initially installed as temporary monitoring wells on April 28, 2016 to address the elevated chloride detections at MW-3. The temporary monitoring wells were constructed with a traditional filter pack, which can mix with the muddy water in the borehole and may increase the amount of time needed to purge the well to an acceptable level of turbidity. The USEPA SESD guidance document also states that turbidity levels may be reduced by low flow purging and sampling techniques. Although low flow purging and sampling techniques were used to purge TMW-1, TMW-2, and TMW-3, the wells may require further development activities during future monitoring events in order to reduce turbidity levels. The impact of turbidity on sample results will continue to be evaluated during future monitoring events, and diligent efforts will be made to reduce the NTU values to representative levels.

Although there have been elevated detections of total cadmium in MW-3, there have been no detections, as of this date, from groundwater samples extracted from temporary monitoring wells TMW-2 and TMW-3 that are immediately down-gradient of MW-3. Total cadmium was not detected above the laboratory PQL in the surface water and sediment samples collected from nearby Charlie Creek and Cane Creek during the September 2017 event. However, total cadmium was detected at Charlie Creek US (**upstream**-total cadmium=0.00375 mg/l) and Charlie Creek MS (midstream-total cadmium=0.002 mg/l) during the December 11, 2017 event. Total Cadmium was not detected above the PQL at any other surface water sample locations (Cane Creek US, Cane Creek MS, and Cane Creek DS-1). The MCL for total cadmium (0.005 mg/L) was not exceeded at either stream location (Charlie Creek US, and Charlie Creek MS). However, the furthest upstream surface water sample location (Charlie Creek US) had the highest reported total cadmium detection of all the stream samples during this December 11, 2017 event. The Charlie Creek US sample location is approximately 2,500 ft. Northwest and upgradient of Charlie Creek MS. With the limited amount of surface water sampling data collected to date, it is difficult to draw any firm conclusions concerning this total cadmium detection upstream. However, based on these limited results, it appears there may be cadmium sources, upstream of the facility, which are not associated with the landfill. Regardless, the confirmed detections for cadmium in the groundwater at MW-3 above the MCL and the accompanying statistically significant trend analysis for total cadmium in MW-3 are of concern and warrant more detailed attention during future quarterly monitoring events.

During this quarterly event, there were also three SSIs over background for barium (MW-3), chloride (MW-3, MW-4, and MW-5), and sulfate (MW-3). The barium, chloride, and sulfate detections observed in the site monitoring wells were all below their associated MCLs or 2DWS.

Glossary of Terms

Appendix I	Refers to the required regulatory sample list of groundwater parameters
CEC	Civil & Environmental Consultants, Inc.
Class I Landfill	Municipal Solid Waste Landfill
Class II Landfill	Industrial Waste Landfill
Class IV Landfill	Construction/Demolition Waste Landfill
Class III/IV Landfill	Landscaping and Construction/Demolition Waste Landfill
DML	Construction Demolition Landfill
EPA	Environmental Protection Agency
ESC	ESC Lab Sciences
EWS	Environmental Waste Solutions
GW	Groundwater
HDPE	High Density Polyethylene
HI	Hydrogeologic Investigation
MCL	Maximum Contaminant Level
µS•cm-1	micro-Siemens per centimeter
mg/L	milligrams per Liter
MW	Monitor Well
NPPL	Non-parametric prediction limit analysis
ORP	Oxidation Reduction Potential
POTW	Publically Owned Treatment Works
ppm	parts per million*
PQL	Practical Quantitation Limit
QC	Quality Control
2DWS	Secondary Drinking Water Standard (EPA)
SNL	Sanitary Landfill
SSI	Statistically Significant Increase
TDEC	Tennessee Department of Environment and Conservation
TDOG	Tennessee Division of Geology
TDSWM	Tennessee Division of Solid Waste Management
TOC	Top of Casing
VOC	Volatile Organic Compound

* ppm – parts per million* is equivalent to mg/L – milligrams per Liter for water samples

1.0 INTRODUCTION

1.1 SITE LOCATION

The former Camden Class II landfill is located just off Highway US 70 at 200 Omar Circle, Camden, Tennessee. The site is located on the Camden, Tennessee USGS quadrangle at north latitude 36° 03' 16" and west longitude -88° 05' 16" at an average elevation of 400 feet above mean sea level datum (MSL). The location of the facility is shown in Appendix A – Figure 1 – Site Location Map. The landfill footprint can be viewed in Appendix A – Figure 2 – Potentiometric Surface Map.

1.2 CURRENT ACTIVITIES

The former EWS Camden Class II Landfill is not currently operating, i.e., the permit has been terminated, and TDEC is in the process of achieving certified final closure of the site by coordinating necessary closure activities. The final closure activities being implemented at the facility are intended to protect the environment and human health. Final closure activities currently underway include leachate treatment, leachate trucking and disposal, storm water management activities, and landfill cap design and construction. The former EWS Camden Class II landfill previously received secondary aluminum smelter waste for disposal including aluminum dross, salt cakes, and other industrial wastes.

2.0 AQUIFER CHARACTERISTICS

2.1 GEOLOGIC AND AQUIFER CHARACTERISTICS

The extensive reworking of the site as a result of the excavation of chert for local road and fill projects has significantly impacted the original site geology. Based upon a review of the Tennessee Division of Geology (TDOG) Geologic Map and site observations it appears that the site is within the Camden and Harriman Formations. It is reported by the TDOG that the Camden and Harriman Formations are lithologically identical and not enough fossils are present to form a convenient basis for subdivision.

2.1.1 Camden and Harriman Formations

The Camden and Harriman Formations are described as follows: chert, gray with specks and mottling's of very light-gray and yellowish-gray (surfaces stained pale to dark yellowish-orange), bedded and blocky (beds 2 to 8 inches thick), dense, conchoidal fracture, contains pods of white to light gray tripolitic clay, locally stained yellow and brown, and fossiliferous. Locally, especially near the top, fragments of chert are cemented into large masses and beds of breccia by dark-brown to moderate-red limonite.

Groundwater potentiometric data collected from the uppermost water bearing zone across the entire landfill site footprint during the 1999 and 2006 hydrogeological investigations indicated that groundwater flow in the uppermost aquifer is generally to the south. Comparisons of the water bearing zone elevations to static groundwater elevations indicate an unconfined aquifer.

2.2 MONITOR WELL INTEGRITY & STATIC WATER LEVELS

The groundwater monitoring network for the former EWS Class II Landfill currently consists of monitoring wells MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3. Due to insufficient groundwater volumes for sampling, MW-2 has been removed from the regular sampling network and replaced by MW-4. MW-2 is still intact and is used for potentiometric surface measurements and field parameter testing. Monitoring well MW-1 serves as an up-gradient monitoring point, while monitoring wells MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 serve as down-gradient monitoring points. The temporary wells (TMW-1, TMW-2, and TMW-3) were installed with the purpose of delineating the areal extent of groundwater contamination and providing additional potentiometric interpretation. The installation of these temporary wells are a response to elevated chloride concentrations at MW-3, which was first detected in the November 2015 sampling event. In addition to providing potentiometric information for the site, these temporary wells yield groundwater samples for water-quality analyses.

The following table presents the wells that were used to develop this report.

Up-gradient Monitoring Points	Down-gradient Monitoring Points
MW-1	MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3

Before purging and sampling activities began, depth to water (DTW) measurements were collected at each of the above-referenced monitoring wells using an electronic water level indicator such as the Solinst® model #122 electronic water-level indicator. DTW measurements were also collected from MW-2 for potentiometric interpretation. DTW measurements were collected in the following order from first to last: MW-1, MW-5, TMW-1, TMW-2, TMW-3, MW-4, MW-2, and finally MW-3.

The integrity of each monitoring well was checked during each sampling event prior to groundwater collection. The physical condition of each wellhead was observed and noted along with the condition of all locking mechanisms for each monitoring well. Once the watertight seal was removed from the top of each monitoring well's casing, the well was allowed to equilibrate to atmospheric conditions. The water-level indicator was decontaminated in accordance with SESD procedures for field water-level measurements in between wells and a new pair of clean nitrile gloves were donned at each monitoring location while collecting DTW measurements. The decontaminated electronic water-level indicator was slowly lowered into the well to establish the distance between the top of casing and the elevation of free groundwater. The electronic probe was capable of determining this distance to within one-hundredth of one foot (0.01 foot). The distance was written in the site-specific field book or field data sheet as DTW. Upon collection of these data, the electronic water-level indicator was removed from the monitoring well and decontaminated.

The following equation is used to determine the elevation of groundwater at each well:

Established Top of Casing Elevation – Depth to Water = Groundwater Elevation

Top of casing elevation has been determined by a licensed land surveyor and is referenced to the current Tennessee State Plan Coordinate System. The top of casing elevations for all site monitoring wells (MW-1, MW-2, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3) were updated by a licensed land surveyor on May 12, 2016. Groundwater elevations are listed in Appendix A – Table 1 – Field Parameters & Potentiometric Data and reflect the most recent survey.

2.3 GROUNDWATER FLOW DIRECTION

Groundwater at the landfill appears to generally flow in a southern direction towards Charlie Creek and Cane Creek. Groundwater flow in the vicinity of the former EWS Class II Landfill generally flows from a topographic high north of the landfill towards monitor wells MW-3, MW-4, and

MW-5 and temporary monitoring wells TMW-1, TMW-2, and TMW-3 which are all down-gradient of the waste cells.

2.4 POTENTIOMETRIC GRADIENT

The potentiometric surface of the first aquifer occurring beneath the former EWS Class II Landfill occurs at approximately twenty-three (23) feet below the top of casing at the up-gradient monitor well MW-1 to approximately twelve (12) feet below the top of casing at monitor well MW-4. The groundwater potentiometric data interpreted from the 1999 and 2006 hydrogeological investigations conducted at the site for the uppermost aquifer indicate that the uppermost water bearing zone generally moves in a southern direction. Comparisons of water bearing zone elevations to static groundwater elevations for both investigations indicate an unconfined aquifer. The potentiometric gradient calculated from groundwater elevation data collected on December 11, 2017 is approximately 1.24 %.

The potentiometric gradient is calculated according to the following formula:

$$\frac{\text{Highest GW. Elev. (MW-1) } \_ \text{ – Lowest GW. Elev. (MW-4)}}{\text{Horizontal Distance between the Wells}} * 100 = \text{Pot. Grad.}$$

$$\frac{(393.48') - (369.72')}{1{,}910'} * 100 = 1.24\%$$

The above calculation assumes a perpendicular gradient between the potentiometric elevations from MW-1 and MW-4. These assumptions may provide an artificially higher potentiometric gradient than is likely occurring at the site.

2.5 HYDRAULIC CONDUCTIVITY

Hydraulic conductivity estimations within the uppermost aquifer occurring beneath the landfill have not been determined at this time.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 INSTRUMENTATION

Before purging and sampling activities began, DTW measurements were collected at each of the monitoring wells (permanent and temporary monitoring wells) using a Solinst® electronic water level indicator, model #122. A YSI Professional Plus® multi-parameter instrument was used to record pH, conductivity, temperature, dissolved oxygen, and ORP during groundwater sampling events at the landfill. A Hach® model 2100Q turbidity meter was used to collect turbidity readings. Each instrument was either checked against known standards or calibrated per manufacturers' specifications prior to the commencement of sampling activities.

3.2 GROUNDWATER PURGING AND COLLECTION OF FIELD PARAMETER VALUES

On November 29, 2017, dedicated submersible bladder pumps (low-flow bladder pumps) were installed in each of the groundwater monitoring wells (MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3). During the December 11, 2017 sampling event, monitoring personnel for the former EWS Class II Landfill began utilizing low-flow protocols as described within the US Environmental Protection Agency's Issue Paper EPA/540/S-95/504: Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, April 1996. Additionally, the operating procedures for groundwater sampling developed by the Region 4 U.S. EPA SESD were followed during this sampling event.

Each dedicated submersible bladder pump is of stainless steel construction and each is equipped with a Teflon™ bladder and dedicated Teflon™-lined bonded twin polyethylene tubing (air line and water discharge line). The low-flow bladder pumps were operated by using a special control box which controls the pressure and frequency of the pumping action, and was used to adjust the flow rate of the water. The flow rate used was adjusted to minimize stress (drawdown), prevent damage to monitoring well components, and to minimize the risk of introducing sediments into the monitoring well through the well's gravel pack. Water pumped was withdrawn directly from the formation with little mixing of casing water or disturbance to the sampling zone. The initial amount of purged groundwater was collected in a clean flow-through cell while measuring temperature, pH, conductivity, dissolved oxygen, and oxidation-reduction potential (ORP) with a YSI® Pro Plus multi-parameter meter (or equivalent) equipped with associated parameter probes. A Hach® model 2100Q turbidity meter (or equivalent) or a multi-meter turbidity probe was used to collect turbidity readings during low-flow purging activities. Each multi-parameter meter and turbidity meter was checked against known standards and calibrated in the field using the manufacturers' specifications prior to the commencement of sampling activities.

The field parameters were documented in the site-specific field forms until proper field stabilization goals had been met, which are defined by the Region 4 U.S. EPA SESD as: "for at least three consecutive measurements, the pH remains constant within 0.1 Standard Unit (SU),

conductivity varies no more than 5 percent, and the turbidity has either stabilized or is below 10 Nephelometric Turbidity Units (NTUs)". Other parameters such as dissolved oxygen (DO) were also measured as a purge-adequacy parameter. Normal goals for DO are 0.2 mg/L or 10% saturation, whichever is greater. Temperature and ORP were measured during purging to obtain measurements of record for these parameters for each sampling event.

Field parameters were collected for the initial amount of water that was purged and measurements were collected periodically until the parameters had stabilized as described above. The start time of purging, the parameter measurements at intervals during purging, estimated pumped volumes, and any notes of unusual conditions were recorded during purging activities. The purge water from down-gradient monitoring wells MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 were containerized and discarded into the on-site leachate collection system storage tank.

During the attempted sampling of MW-3 on December 11, 2017, a sample with an acceptable turbidity could not be obtained from the given well. On December 13, 2017, another sample attempt was made at sampling MW-3. Three well volumes were removed from MW-3 on December 13. Because the well was almost purged dry and recharging water had high turbidity, the well was allowed to recharge overnight and the sample was collected the following day (within 24 hours of purging). Sampling was performed at MW-3 on December 14, 2017 using a new disposable Teflon™ bailer. The bailer was factory decontaminated and sealed to prevent environmental cross contamination. New nylon twine was fixed to each bailer via a tied knot.

The total volume of groundwater residing in each well was calculated as follows: (1) subtracting the depth to water from the total depth of the well and (2) the depth of water in feet was multiplied by 0.163 gallons per foot in a 2-inch (inside diameter) monitoring well. The initial amount of purged groundwater was collected in a clean, HDPE container and field chemistry parameters (pH, conductivity, dissolved oxygen and ORP) were collected using a YSI® Pro Plus multi-parameter meter (or equivalent) equipped with associated parameter probes. A Hach® model 2100Q turbidity meter was used to collect turbidity readings during purging activities. Each multi-parameter meter and turbidity meter was checked against known standards and calibrated in the field using the manufacturers' specifications prior to the commencement of purging and sampling activities. The turbidity was measured by collecting a small volume of water and using the Hach® model 2100Q turbidimeter. These values were noted in the site-specific field forms.

Groundwater was purged from the wells until one calculated well volume of water was removed. Once this volume of water was purged, the field chemistry parameters were again measured and recorded in the field forms as V_1 (or recorded as gallons). This procedure for purging groundwater continued for an additional well volume, V_2. After the second purged well volume was observed for field parameter values, the values were checked against values for V_1. If the pH and conductivity values for each volume purged varied no more than 10% from V_1 to V_2 and the temperature stabilized to within one degree Celsius, preparations were made to collect the groundwater sample for submittal to the analytical laboratory. With respect to ground water

chemistry, an adequate purge is achieved when the pH and conductivity have stabilized and the turbidity has either stabilized or is below 10 NTUs. If the field parameters were not stable, the purging procedures continued until either one of the following adequate purge conditions were met:

1. Field stabilization occurred;
2. Well was purged dry. For wells with slow recovery, attempts were made to avoid purging to dryness by slowing the purge rate. In some situations, even with slow purge rates, the well may be pumped dry. This situation generally indicates that an adequate purge had been achieved; and the well was sampled following sufficient recovery (enough volume to allow filling of all sample containers); or
3. A minimum of three well volumes were purged.

Field parameter values for each well are presented in Table 1 – Groundwater Field Data in Appendix A. A detailed account of each purge and sample procedure conducted at each monitor well is presented in Appendix D – Standard Operating Procedures.

3.3 GROUNDWATER SAMPLE COLLECTION & PRESERVATION

Groundwater samples were collected from monitoring wells when field parameter data indicated that stagnant water had been purged from the well and replaced by groundwater from the adjacent formation that is representative of actual aquifer conditions. Groundwater was placed in laboratory supplied sample vessels in the following order: Appendix I organics – three (3) forty (40) mL amber glass containers preserved with hydrochloric acid (HCl); total metals (Appendix I metals, Al, Ca, Fe, K, Mg, Mn, Na, and Boron) – one (1) five-hundred (500) ml HDPE container preserved with nitric acid (HNO_3); alkalinity, bromide, chloride, nitrate, and sulfate – one (1) two-hundred fifty (250) ml unpreserved HDPE container; COD & ammonia – one (1) two-hundred fifty (250) ml HDPE jar preserved with sulfuric acid (H_2SO_4). In addition to total metals analysis, a dissolved metals sample were collected for analysis (dissolved Appendix I metals, Al, Ca, Fe, K, Mg, Na, and Boron) at each location. Each dissolved metals sample was collected by field filtering the groundwater using a new disposable 0.45 micron filter and placing the filtered groundwater into one (1) five-hundred (500) ml HDPE container preserved with HNO3. As soon as samples were collected in their respective containers, samples were preserved accordingly and placed on ice in a sample cooler.

3.4 STREAM AND SEDIMENT SAMPLE COLLECTION AND PRESERVATION

The stream sampling activities were completed in accordance with the USEPA sampling procedure - SESDPROC-201-R4 titled “Surface Water Sampling”. The sediment sampling activities were completed in accordance with the USEPA SESD sampling procedure -SESDPROC-200-R3 titled “Sediment Sampling”. Stream (surface water and sediment) sample locations included the following:

- Charlie Creek US: Charlie creek upstream north side of SR-191 within Right-of-Way (ROW);
- Cane Creek US: Cane creek upstream side of S Forrest Ave. within ROW;
- Charlie Creek MS: South of landfill footprint, before confluence;
- Cane Creek MS: South of landfill footprint, after confluence, and
- Cane Creek DS-1: Stream location at landfill property boundary, before Camden WWTP.

Stream and sediment samples were taken beginning at the furthest downstream sampling location, moving back upstream, ending with the furthest designated upstream sampling location.

3.4.1 Stream Sampling

The surface water sample was collected prior to the collection of the sediment sample at approximately the same location in the stream. CEC sampling personnel faced upstream and collected the sample without disturbing the bottom sediments. The surface water samples were collected in laboratory supplied sample vessels for the analysis of: total metals (Appendix I metals, Al, Ca, Fe, K, Mg, Mn, Na, and Boron) – one (1) five-hundred (500) ml HDPE container preserved with nitric acid (HNO_3); total hardness, bromide, chloride, and fluoride – one (1) two-hundred fifty (250) ml unpreserved HDPE container; dissolved metals (Appendix I metals, Al, Ca, Fe, K, Mg, Mn, Na, and Boron) - one (1) five-hundred (500) ml unpreserved HDPE container, which was submitted to the laboratory for filtering prior to analysis for dissolved metals.

3.4.2 Sediment Sampling

The sediment sampling method was accomplished by wading into the surface water body and, while facing upstream (into the current), removing the upper surface layer of sediment using a stainless steel scoop or spoon along the bottom of the surface water body in the upstream direction.

Excess water was carefully drained from the scoop or spoon so as to minimize the loss of fine-grained particles associated with the sampled substrate. Aliquots of the sample thus collected were placed in a glass pan and homogenized according to the quartering method described in the USEPA SESD sampling procedures.

After the sediment aliquots were homogenized, the samples were placed into appropriate, lab-supplied sample containers using the alternative shoveling method and the caps were tightly secured. The alternate shoveling method is accomplished by placing separate scoops of the homogenized sediments in each container in sequence and repeating until all containers are full or the sample has been exhausted. The threads on each container and lid were cleaned to ensure a tight seal when closed. The sediment samples were collected in their respective sample containers for the analysis of: total metals (Appendix I metals, Al, Ca, Fe, K, Mg, Mn, Na, and Boron), bromide, chloride, and fluoride.

Equipment used to collect field samples was cleaned and decontaminated in accordance with SESD - Field Equipment Cleaning and Decontamination procedures.

3.5 QUALITY ASSURANCE AND QUALITY CONTROL

3.5.1 Field Quality Assurance and Quality Control

Field Quality Assurance and Quality Control (QA/QC) samples were collected as part of the groundwater sampling program. Quality assurance (with internal laboratory quality controls) addresses the accuracy and repeatability of analytical results after analysis in the laboratory. Quality control addresses methods to preserve the integrity of samples in the field and during shipping to the laboratory. Quality control may be accomplished by incorporating trip blanks, field blanks, field duplicates, and equipment (rinsate) blanks into the analytical program.

A field blank and a duplicate sample were collected during this monitoring event performed at the former EWS Class II Landfill. CEC collected a field blank next to monitoring well MW-5 and a duplicate sample was collected from MW-4 during this sampling event. The field blank was collected by pouring deionized water into a set of sample bottles provided by the laboratory, thereby allowing any airborne contaminants a chance to enter the field blank sample. Also, a laboratory supplied trip blank for VOC analysis was prepared and placed in a cooler which was present during groundwater sampling activities. Upon the collection of the final groundwater sample, the trip blank was placed in a sample cooler and delivered to ESC for VOC analysis. No VOCs were detected above the laboratory PQL in the trip blank sample.

ESC reported the groundwater laboratory analytical results to CEC on December 21, 2017 and February 2, 2017. Laboratory analytical testing of the field blank presented in the analytical report revealed that none of the tested constituents were above the PQL. The results for the duplicate sample collected from MW-4 were similar to the original MW-4 sample results.

3.5.2 Laboratory Quality Assurance and Quality Control

In order to demonstrate that a laboratory is producing data of adequate precision, accuracy and sensitivity it is necessary to assess all laboratory procedures at all stages from sampling to reporting. The laboratory completed specific control and assessment procedures designed to monitor, quantitatively, the accuracy and precision of specific assays. Laboratory Internal Quality Assurance (IQA) refers to the full range of practices employed to ensure that laboratory results are reliable. Internal Laboratory Quality Control (IQC) consists of the operational techniques used by the laboratory staff for continuous assessment of the quality of the results of individual analytical procedures. The specific quality-control procedures utilized by the analytical laboratory are summarized in the following table.

Quality Criteria Category	Quality Control Laboratory Methods
Precision	Laboratory duplicates at a frequency of one per matrix spike, one per laboratory control sample, and one per method blank
Bias	Matrix spikes, laboratory control samples, method blanks at a frequency of one sample per standard batch
Representative and Comparable Data	Adherence to standard analytical procedures, analytical methods, units of measurement, and detection limits.

The internal laboratory IQA and IQC results are included in the laboratory analytical reports located in Appendix C-Laboratory Analytical Reports and Field Information Logs.

3.6 SAMPLE CHAIN-OF-CUSTODY

A sample Chain-of-Custody (COC) traveled along with the sample kit from ESC to the former EWS Class II Landfill site and back to ESC for the December 2017 sampling event. The CEC SOP 07-01-01 for maintaining sample Chain of Custody may be found in Appendix D – CEC Standard Operating Procedures.

4.0 LABORATORY ANALYTICAL PROCEDURES

4.1 ANALYTICAL METHODS

All laboratory analyses for the fourth quarter 2017 groundwater assessment-monitoring event were completed by ESC Lab Sciences in Mt. Juliet, Tennessee. The analytical methods chosen for these monitoring events were in full compliance with the procedures required by the DSWM and the USEPA's publication SW-846, entitled Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (3rd Edition).

The SW-846 methods used for the analysis of **groundwater and leachate samples** were as follows:

Method 6010b	Inductively Coupled Plasma (ICP) – Atomic Emission Spectrometry (Boron only)
Method 6020	ICP – Mass Spectrometry (metals & dissolved metals)
Method 2320 B-2011	Alkalinity
Method 7470A	Mercury in Liquid Waste – Manual Cold Vapor Technique
Method 8011	1,2-dibromoethane & 1,2 dibromo-3-chloropropane by Micro-extraction and Gas Chromatography
Method 8260B	Volatile Organic Compounds by Gas Chromatograph/Mass Spectrometry
Method 9056A	Determination of Inorganic Anions by Ion Chromatography (Bromide, Chloride, Fluoride, Nitrate, and Sulfate)
Method 350.1	Ammonia Nitrogen
Method 410.4	Chemical Oxygen Demand (COD)

The SW-846 methods used for the analysis of **stream samples** were as follows:

Method 6010b	Inductively Coupled Plasma (ICP) – Atomic Emission Spectrometry (Boron only)
Method 6020	ICP – Mass Spectrometry (metals & dissolved metals)
Method 130.1	Total Hardness
Method 7470A	Mercury in Liquid Waste – Manual Cold Vapor Technique
Method 9056A	Determination of Inorganic Anions by Ion Chromatography (Bromide, Chloride, Fluoride)

The SW-846 methods used for the analysis of **sediment samples** were as follows:

Method 6010b	Inductively Coupled Plasma (ICP) – Atomic Emission Spectrometry
Method 7470A	Mercury in Liquid Waste – Manual Cold Vapor Technique

Method 9056A Determination of Inorganic Anions by Ion Chromatography (Bromide, Chloride, Fluoride)

4.2 LABORATORY ANALYTICAL RESULTS

Fourth quarter groundwater samples were collected by CEC on December 11, 2017 and December 14, 2017 (MW-3 only). ESC performed the groundwater analysis and reported the results on December 21, 2017 and February 2, 2017 (MW-3 only). Fourth quarter leachate samples were collected by CEC on December 12, 2017 from the "Aluminum Processing Waste Cell (APWC)" and "Industrial Waste Cell (IWC)" leachate sample locations. ESC performed the leachate analysis and reported the results on December 21, 2017. Fourth quarter surface water and sediment samples were collected from the Cane Creek and Charlie Creek by CEC on December 11, 2017, and ESC reported the results on December 20, 2017.

Constituent values from all inorganic laboratory analyses for groundwater and leachate samples, along with applicable MCLs or 2DWSs, are presented in Table 2a – Groundwater and Leachate Analytical Results in Appendix A. Constituent values from all inorganic laboratory analyses for stream and sediment samples are presented in Table 2b – Stream and Sediment Analytical Results in Appendix A. Copies of the laboratory reports are located in Appendix C – Laboratory Analytical Reports.

4.3 QUALITY CONTROL QUALIFIER CODES

The EPA Contract Laboratory Program states that sample and result qualifiers should be utilized as part of a total quality-control process. ESC complies with this directive and reports all qualifiers along with explanations of QC qualifier codes. Four QC qualifier codes (B, J4, T8, and P1) were indicated during the laboratory analysis of groundwater samples collected on December 11, 2017. Three QC qualifier codes (J3, J4, and T8) were indicated during the laboratory analysis of groundwater samples collected from MW-3 on December 14, 2017. Three QC qualifier codes (B J4, and V3) were indicated during the laboratory analysis of leachate samples during the fourth quarter monitoring event. One QC qualifier code (P1) was indicated during the laboratory analysis of stream and sediment samples collected on December 11, 2017.

The qualifiers that may have affected the reported results are the B Qualifier (dissolved mercury at MW-1 and IWC-L, Hardness at TMW-1, barium at APWC-L, and dissolved manganese at TMW-2 and APWC-L), the T8 Qualifier (Nitrate at MW-1 and MW-5, orthophosphate at MW-3), and the V3 Qualifier (MEK at APWC-L). The B Qualifier indicates that the constituent was also identified in the associated blank. Therefore, the reported result may be higher than what is actually present in the sample. The T8 Qualifier indicates that the laboratory received the samples within the required hold-time but analyzed the sample slightly outside the required hold-time. Analyzing results out of hold time may affect sample results; however, the reported nitrate results are generally consistent with historical data. The V3 Qualifier indicated that the sample result was biased high due to sample matrix interference, therefore the detected result may be a laboratory

error. Specific information concerning each laboratory QC qualifier code are described in the Laboratory Analytical Reports in Appendix C.

5.0 STATISTICAL ANALYSIS

5.1 APPLICABLE METHODS

The Rules of the Tennessee Department of Environment and Conservation, Division of Solid Waste Management Chapter 1200-1-7-.04 state, in part, that each landfill must conduct and report statistical analyses as part of the evaluation of groundwater monitoring data. Statistical analyses of the sampling data was performed on monitoring wells MW-1, MW-3, MW-4, and MW-5. The temporary wells TMW-1, TMW-2, and TMW-3 were installed in response to the elevated chloride concentrations in MW-3 for the purpose of delineating groundwater hydrology/hydraulics during assessment monitoring and for collecting groundwater samples for water-quality analyses. Due to limited water-quality data acquired at this time, statistical analyses using data from these wells has not been performed.

First, the distribution of the data was evaluated for normality. The test for normality was conducted using the Shapiro-Wilks method if N <50 or Shapiro-Francia method if N>50. The normality test was performed for both raw and log-transformed data with replacement of non-detects to half of the corresponding laboratory detection limit. Data determined to be normally distributed are to be evaluated using parametric prediction interval analysis. Data that were not normally distributed are to be evaluated using non-parametric statistical methods. Inter-well and intra-well parametric and non-parametric prediction limit analyses (NPPL) was deemed appropriate for this data set. Inter-well analyses compared the concentrations observed at the down-gradient monitoring locations (MW-3, MW-4, and MW-5) to the concentrations observed at the up-gradient monitoring location (MW-1) during this monitoring event. Intra-well analyses was utilized only at MW-1 to compare the concentrations observed during the current groundwater sampling event to the established background data set for MW-1 concentrations.

MW-5 was installed on April 26, 2016 and the initial background sampling event (n=1) occurred on April 28, 2016. After the initial sampling event, MW-5 was sampled on May 9, 2016 (n=2), November 10, 2016 (n=3), and on June 8, 2017 (n=4). At least four separate sampling events are needed at each sampling location in order to establish adequate background data for statistical analyses. Since four separate sampling events have now been completed at MW-5, the data were incorporated into the inter-well statistical analyses for the site during this reporting event.

The percentage of inter-well background non-detects for each parameter determines the primary statistical method utilized for each parameter. If the percentage of non-detects in the background samples is less than 50%, Shewart-CUSUM control charts are utilized. If more than 50% background non-detects exist for the given parameter, non-parametric inter-well prediction limit analyses was conducted on the data. For this site, based on the high amount of left-censored data (>50% of non-detects), non-parametric inter-well prediction limit analyses was conducted for the data from down-gradient monitoring wells (MW-3, MW-4, MW-5). Intra-well prediction limit analyses was conducted for the data from the up-gradient monitoring well (MW-1). Additional

statistical procedures performed included Mann-Kendall trend analysis and the non-parametric Wilcoxon Rank Sum group comparisons (with non-detects set to the highest reporting limit for the given constituent analyzed).

The computer program ChemStat was used for all statistical computations. Worksheets for inter-well and intra-well statistical analysis and time versus concentration charts are given in Appendix B – Statistical Evaluations and Time Series Plots.

5.2 STATISTICAL RESULTS

Total cadmium was detected above the MCL at MW-3, during the December 14, 2017 event (total cadmium at MW-3 = 0.00659 mg/l), which was slightly lower than the September 28, 2017 event (total cadmium at MW-3 = 0.00926 mg/l). Cadmium was first detected above the laboratory PQL in MW-3 during the 4th quarter 2016 sampling event completed on November 10, 2016 (total cadmium at MW-3=0.00177), which was below the MCL. Cadmium was first detected above the MCL at MW-3 during the June 2017 sampling event (0.0286 mg/l). Another follow-up sampling event was carried out at MW-3 on August 8, 2017 in order to re-sample MW-3 to supplement the overall number of groundwater data values and to validate the previously observed results. The August 8, 2017 result for total cadmium in MW-3 was 0.0113 mg/l.

The chloride concentration reported at MW-3 was 104 mg/l during the December 14, 2017 sampling event, which was below the 2DWS for chloride concentrations (250 mg/l), and the result was less than the concentrations reported during the previous third quarter 2017 sampling event (112 mg/l). Also, the chloride concentration reported at MW-3 during this event was less than the reported chloride concentrations at MW-3 in June 2017 (163 mg/l), March 2017 (164 mg/l), and August 2016 (218 mg/l). Since the second semi-annual monitoring event in November 2015 (458 mg/L) and the supplemental re-sampling event (360 mg/L) in December 2015, chloride concentrations at MW-3 have remained below the 250 mg/l 2DWS for chloride concentrations. However, a statistically upward trend in chloride concentrations at MW-3 and MW-5 was indicated using the Mann-Kendall trend analysis at the 95% confidence level.

The chloride concentration observed at MW-4 (6.76 mg/l) and MW-5 (52.5 mg/l) produced an SSI over background during this event. The chloride concentration observed at MW-5 is below the 2DWS for chloride concentrations and, when considering all MW-5 data to date since April 28, 2016, indicated an upward trend in chloride concentrations for the first time using the Mann-Kendall trend analyses at the 95% confidence level. Although the chloride concentrations at MW-5 appear to have increased slightly since November 2016 (chloride=28.6 mg/l), there is still a limited amount of data that has been collected (six total events at MW-5) since MW-5 was installed in April 2016. The chloride detection at MW-4 is consistent with previous data, is below the 2DWS for chloride concentrations (250 mg/L), and, when considering all MW-4 chloride data to date, did not show an upward or downward trend in chloride concentrations using the Mann-Kendall trend analysis at the 95% confidence level. Regardless, the chloride concentrations at

MW-3, MW-4, and MW-5 will continue to be closely monitored in future quarterly monitoring events.

SSIs over background identified for the current monitoring event include total barium at MW-3, chloride at MW-3, MW-4, and MW-5, and sulfate at MW-3. The total barium concentration at MW-3 was 0.119 mg/l during this sampling event, which was less than the previous September 2017 sampling event (0.125 mg/l) and is less than the previous nine sample results collected at MW-3 since November 21, 2014. Total barium also remains below the MCL for the primary drinking water standard for barium (2 mg/L).

The sulfate concentration observed at MW-3 during this sampling event was 46.2 mg/l and was equal to the concentration reported during the previous third quarter 2017 sampling event completed in September 2017 (46.2 mg/l) and less than the concentrations reported during the second quarter 2017 sampling event (93.7 mg/l) completed in June 2017. For further comparisons, the detected sulfate concentrations at MW-3 in November 2016 was 34 mg/L, 95.7 mg/L in August 2016 and 105 mg/L in March 2017. Prior to August 2016, the reported sulfate concentrations at MW-3 ranged from <5 mg/l to 29.1 mg/l. The reported sulfate concentrations have remained below the 2DWS for sulfate (250 mg/l) for all sampling events to date. However, a SSI in reported sulfate concentrations at MW-3 was identified during this sampling event, and a statistically upward trend in sulfate concentrations at MW-3 was indicated using the Mann-Kendall trend analysis at the 95% confidence level.

The Mann-Kendall trend analyses at the 95% confidence level was utilized by incorporating current and past groundwater data. Trend analyses revealed a statistically significant upward trend in barium, total cadmium, chloride, sulfate, and zinc concentrations reported at MW-3. The Mann-Kendall trend analysis indicated a statistically significant upward trend in total cadmium and total zinc concentrations reported at MW-3. The Mann-Kendall trend analysis has indicated a statistically significant upward trend in total cadmium concentrations at MW-3 during three previous monitoring events (November 2016 June 2017, and September 2017) and indicated a statistically significant upward trend in total zinc concentrations at MW-3 since the June, 2017 monitoring event. Trend analyses revealed a statistically significant downward trend in total barium detections at MW-4 and no distinct statistically significant trend in chloride detections at MW-4.

MW-3 was allowed to recharge overnight which yielded a low turbidity sample that was closer to the recommended goal for turbidity for each sample of 10 NTUs; the measured turbidity at MW-3 was 23.0 NTU when the total metals sample was collected at MW-3 on December 14, 2017. A higher NTU value generally correlates to a higher amount of sediment in the water being sampled. Since total metals concentrations can be directly correlated to the amount of sediment in each sample and the NTU value was above the recommended goal of 10 NTU, analytical procedures were carried out for dissolved metals concentrations (field filtered and laboratory filtered). After field filtering the groundwater sample at MW-3, the measured turbidity was 5.37 NTU. The field-

filtered dissolved cadmium concentration (0.00733 mg/l) at MW-3 was similar to the total cadmium at MW-3 and was slightly above the MCL for total cadmium concentrations. A correlation cannot be made between the NTU value of the groundwater samples and the total cadmium concentrations observed at the wells based on this one sample event (e.g., total cadmium was detected in MW-3 with a turbidity of 23.0 NTUs while TMW-2 and TMW-3 had higher sample turbidities but no detections of total cadmium). TMW-1, TMW-2, and TMW-3 were installed initially as temporary monitoring wells on April 28, 2016 and were constructed with a traditional filter pack which can mix with the muddy water in the borehole, which may increase the amount of time needed to purge the well to an acceptable level of turbidity. The USEPA SESD guidance document also states that turbidity levels may be reduced by low flow purging and sampling techniques. Although low flow purging and sampling techniques were used to purge TMW-1, TMW-2, and TMW-3 it appears that the wells may require further development activities during future monitoring events before the turbidity values observed at temporary monitoring wells will be reduced. The impact of turbidity on sample results will continue to be evaluated during future monitoring events, and diligent efforts will be made to reduce the NTU values to representative levels. Also, CEC recommends to continue collecting field-filtered samples for dissolved metals analysis in addition to total metals analysis at each monitoring well.

When analyzing a sample for total and dissolved metals, it is normally expected that the dissolved metal concentrations should be less than the total metals. However, the accuracy of the analytical results are generally dependent upon sample preparation and analytical methods/operations. A sample analyzed for total and dissolved metals may have slightly different concentrations due to normal variations in the analytical process. Slightly higher concentrations present in dissolved versus total analyses can occur even though all quality controls are deemed acceptable. This variation in sample results is commonly controlled by calculating the relative percent difference (RPD). In general, a RPD value less than 20% is acceptable for quality control purposes. The RPD between total and dissolved results can be used to evaluate whether the reported concentrations given for total and dissolved cadmium are indistinguishable at MW-3. The calculated RPD between sample results reported for total and dissolved cadmium (field-filtered and laboratory filtered) was less than 20%.

The RPD for total cadmium (Cd) versus dissolved Cd at MW-3 was calculated according to the following formula:

$$\frac{|\text{Total Cd conc. in mg/l (MW-3)} - \text{Dissolved Cd conc. in mg/l (MW-3)}|}{[\text{Total Cd conc. in mg/l (MW-3)} + \text{Dissolved Cd conc. in mg/l (MW-3)}]/2} * 100 = \%\text{RPD}$$

Total Cd concentration compared to dissolved Cd **(field- filtered)** concentration:

$$\frac{|0.00659 \text{ mg/l (total Cd at MW-3)} - 0.00733 \text{ mg/l (dissolved Cd at MW-3)}|}{[0.00659 \text{ mg/l (total Cd at MW-3)} + 0.00733 \text{ mg/l (dissolved Cd at MW-3)}]/2} * 100 = 10.63\%$$

The statistical trend analysis for total cadmium at MW-3 does confirm an increasing trend having statistical significance when considering all current and past data for cadmium at MW-3. In contrast, statistical group comparisons, comparing background data to MW-3 data, do not draw any firm conclusions as to whether the increase in total cadmium at MW-3 is statistically significant. However, the results of the current statistical group comparison analyses come from a limited data set with few values exceeding the reporting limit. As a result, obtaining more groundwater samples from MW-3 for total cadmium, as well as the other measured constituents, is recommended.

Although there have been elevated detections of total cadmium in MW-3, there have been no detections, as of this date, from groundwater samples extracted from temporary monitoring wells TMW-2 and TMW-3 that are immediately down-gradient of MW-3.

However, total lead was detected in TMW-1 and TMW-2 at concentrations that exceeded the EPA MCLs. The MCL exceedances at TMW-1 and TMW-2 were likely affected by the elevated turbidity at TMW-1 (315 NTU) and TMW-2 (>1000 NTU) at the time of sampling. As previously discussed, TMW-1 and TMW-2 were initially installed as a temporary monitoring location to address the elevated chloride detections at MW-3. According to the USEPA SESD guidance document titled "Design and Installation of Monitoring Wells", temporary wells are cost effective, may be installed quickly, and provide a synoptic picture of groundwater quality and are generally installed, purged, sampled, removed, and backfilled in a matter of hours. TMW-1, TMW-2, and TMW-3 were constructed with a traditional filter pack, which can mix with the muddy water in the borehole and may increase the amount of time needed to purge the well to an acceptable level of turbidity. The USEPA SESD guidance document also states that turbidity levels may be reduced by low flow purging and sampling techniques. Although low flow purging and sampling techniques were used to purge TMW-1 and TMW-2, it appears that the well may require further development activities during future monitoring events before the observed turbidity values at TMW-1 and TMW-2 will be reduced.

Total cadmium was not detected above the laboratory PQL in the surface water and sediment samples collected from nearby Charlie Creek and Cane Creek during the September 2017 event. However, total cadmium was detected at Charlie Creek US (**upstream**-total cadmium=0.00375 mg/l) and Charlie Creek MS (midstream-total cadmium=0.002 mg/l) during the December 11, 2017 event. The concentrations at Charlie Creek US and Charlie Creek MS are both below the MCL for cadmium of 0.005 mg/L. Total Cadmium was not detected above the PQL at any other surface water sample locations (Cane Creek US, Cane Creek MS, Cane Creek DS-1). The MCL for total cadmium (0.005 mg/L) was not exceeded at either stream location. However, the furthest upstream surface water sample location had the highest reported total cadmium detection of all the stream samples during this December 11, 2017 event. The Charlie Creek US sample location is approximately 2,500 ft. from Charlie Creek MS. With the limited amount of surface water sampling data collected to date, it is difficult to draw any firm conclusions concerning this total cadmium detection upstream. However, based on these limited results, it appears there may be

cadmium sources, upstream of the facility, which are not associated with the landfill. Regardless, the confirmed detections for total and dissolved cadmium above the MCL and the accompanying statistically significant trend analysis for total cadmium in MW-3 are of concern and warrant more detailed attention during future quarterly monitoring events.

The chloride, total cadmium, sulfate, and total zinc concentrations at MW-3, MW-4, and MW-5, as well as the lead concentrations at TMW-1 and TMW-2, will continue to be closely monitored and statistically analyzed during future monitoring events.

No SSIs in reported concentrations were identified in up-gradient well MW-1 using intra-well non-parametric analysis.

A summary of intra-well and inter-well statistical analysis is presented in Table 3 – Intra-Well and Inter-Well Statistical Summary in Appendix A.

6.0 CONCLUSIONS

Representative groundwater samples were collected from permanent monitoring wells MW-1, MW-3, MW-4, and MW-5, and temporary monitoring wells TMW-1, TMW-2, and TMW-3. The groundwater samples were analyzed for the Appendix I organics, total metals (appendix I metals plus aluminum, calcium, iron, magnesium, manganese, potassium, sodium, and boron), alkalinity, bromide, chloride, nitrate, sulfate, ammonia, and COD. Each groundwater well location was also sampled for analysis of dissolved metals (field filtered).

Stream (surface water) and sediment locations were sampled for analysis at Charlie Creek US, Charlie Creek MS, Cane Creek US, Cane Creek MS, and Cane Creek DS-1. All stream (surface water) samples were analyzed for the Appendix I metals plus aluminum, calcium, iron, magnesium, manganese, potassium, sodium, bromide, chloride, fluoride, and total hardness. Also, each stream sample location was sampled for analysis of dissolved metals (laboratory filtered only). All sediment samples collected from the stream were analyzed for the same list of parameters with the exception of total hardness and dissolved metals.

The results of the third quarter assessment monitoring event of 2017 for MW-3 are summarized as follows.

- Total cadmium was detected above the MCL at MW-3 during the December 14, 2017 event (total cadmium at MW-3=0.00659 mg/l) which was slightly above the MCL (0.005 mg/L) for the fourth consecutive sampling event at MW-3 since June 8, 2017. In addition, dissolved cadmium was detected slightly above the MCL at MW-3 during the December 14, 2017 event (dissolved cadmium=0.00733) and was similar to the total cadmium detection at MW-3. Although total cadmium concentrations have been above the MCL at MW-3, the total cadmium concentrations at MW-3 have decreased each sampling event since June 8, 2017. Total cadmium was first detected above the MCL at MW-3 during the June 8, 2017 event (total cadmium at MW-3 = 0.0286 mg/l). Another follow-up sampling event was carried out at MW-3 on August 8, 2017 in order to re-sample MW-3 to validate the previously reported cadmium concentrations. The August 8, 2017 re-sample result for total cadmium in MW-3 was 0.0113 mg/l. The total cadmium detected during this event was less than the previous September 28, 2017 event (total cadmium at MW-3=0.00926). Also, the dissolved cadmium detected at MW-3 during this event was less than the previous September 28, 2017 event (dissolved cadmium field filtered=0.0104 mg/l, dissolved cadmium lab filtered=0.0102 mg/l). However, the detections of total cadmium and dissolved cadmium remain at levels slightly above the MCL and the accompanying statistically significant trend analysis for cadmium in MW-3 are of concern and warrant continued detailed attention during future quarterly monitoring events.

- The source of the cadmium detections above the MCL in MW-3 has not been determined at this point. Based on current data, the impact location appears to be limited to the MW-3 location, since there have been no detections from groundwater samples extracted from temporary monitoring wells TMW-2 and TMW-3 that are immediately down-gradient of MW-3.

- Total cadmium was not detected above the laboratory PQL in the surface water and sediment samples collected from nearby Charlie Creek and Cane Creek during the September 2017 event and a majority of the surface water samples collected in December 2017. However, total cadmium was detected above the PQL at Charlie Creek US and Charlie Creek MS during the December 11, 2017 event. Total Cadmium was not detected above the PQL at any other surface water sample locations (Cane Creek US, Cane Creek MS, and Cane Creek DS-1) during this event. Therefore, the furthest upstream surface-water sample location (approximately 2,500 ft. upstream from the Charlie Creek MS sampled location) had the highest reported total cadmium detection during this December 11, 2017 event. With the limited amount of surface water sampling data collected to date, it is difficult to explain or draw any firm conclusions concerning this total cadmium detection upstream. However, based on these limited results, it appears there may be cadmium sources, upstream of the facility, which are not associated with the landfill.

- Similarly, the statistical trend analysis for total zinc data at MW-3 (total zinc during the current event at MW-3= 0.0439 mg/l) confirmed an increasing trend having statistical significance, and an SSI based on non-parametric prediction limits. Zinc was first detected above the laboratory PQL at MW-3 during the previous June 2017 groundwater event (total zinc=0.0769 mg/l). Before June 2017, zinc had remained below the current laboratory detection limit of 0.025 mg/l since July of 2010. Although zinc levels are above the PQL, they remain well below the 2DWS of 5 mg/L.

- A SSI was identified for the reported chloride concentrations at MW-3, MW-4, and MW-5 during this event. Chloride concentrations at MW-3 and MW-5 exhibited a statistically significant increasing trend per the Mann-Kendall non-parametric trend procedure. The chloride concentration reported at MW-3 was 104 mg/l during this sampling event. This concentration was below the 2DWS for chloride concentrations (250 mg/l) and was less than the concentrations reported during the previous third quarter 2017 sampling event (112 mg/l). Also, the chloride concentration reported at MW-3 during this event was less than the reported chloride concentrations at MW-3 in June 2017 (163 mg/l), March 2017 (164 mg/l) and August 2016 (218 mg/l). Since the second semi-annual monitoring event in November 2015 (458 mg/L) and the supplemental re-sampling event (360 mg/L) in December 2015, the chloride concentrations at MW-3 have remained below the 250 mg/l 2DWS for chloride concentrations.

  The chloride concentration observed at MW-4 (6.76 mg/l) and MW-5 (52.5 mg/l) produced an SSI over background during this event. The chloride concentration observed at MW-5 is below the 2DWS for chloride concentrations and, when considering all MW-5 data to date since April 28, 2016, indicated an upward trend in chloride concentrations for the first time using the Mann-Kendall trend analyses at the 95% confidence level. Although the chloride concentrations at MW-5 appear to have increased slightly since November 2016 (chloride=28.6 mg/l), there is still a limited amount of data that has been collected (six total events at MW-5) since MW-5 was installed in April 2016. The chloride detection at MW-4 is consistent with previous data, is below the 2DWS for chloride concentrations (250 mg/L) and, when considering all MW-4 chloride data to date, did not show an upward or downward trend in chloride concentrations using the Mann-Kendall trend analysis at the

95% confidence level. Regardless, the chloride concentrations at MW-3, MW-4, and MW-5 will continue to be closely monitored in future quarterly monitoring events.

- A SSI was identified for the reported sulfate concentration at MW-3 during this event. Also, the sulfate concentration at MW-3 exhibited a statistically significant increasing trend per the Mann-Kendall non-parametric trend analyses at the 95% confidence level. The sulfate concentration reported at MW-3 was 46.2 mg/l during this sampling event. This concentration was below the 2DWS for sulfate concentrations (250 mg/l) and was equal to the concentration reported during the previous third quarter 2017 sampling event (46.2 mg/l). The sulfate concentrations at MW-3 have remained below the 250 mg/l 2DWS for sulfate. It is worth noting that sulfate has not consistently been detected above the PQL (5 mg/l) at any of the other permanent monitoring wells or temporary monitoring wells. The sulfate concentrations at MW-3 will continue to be closely monitored during future quarterly monitoring events.

- Total lead was detected in TMW-1 and TMW-2 at concentrations that exceeded the EPA MCLs. The MCL exceedances at TMW-1 and TMW-2 were likely affected by the elevated turbidity at TMW-1 (315 NTU) and TMW-2 (>1000 NTU) at the time of sampling.

- Time series graphs prepared for MW-3 indicate a general increasing trend, starting in 2014, for chloride, total calcium, total magnesium, total potassium, total sodium, and sulfate.

- The Mann-Kendall trend analysis at the 95% confidence level revealed a statistically significant upward trend in total barium, total cadmium, chloride, sulfate, and total zinc concentrations reported at MW-3 during this event.

- No VOCs were detected above their respective laboratory PQL during the monitoring event.

- No constituents were detected above their respective MCL at any of the stream (surface water) samples.

- There were no cadmium detections in the sediment samples.

6.1 EWS GROUNDWATER QUALITY RELATIVE TO THE EPA PRIMARY DRINKING WATER STANDARDS

Laboratory analytical results for the groundwater samples collected in December of 2017 from the former EWS Class II Landfill indicate that total arsenic in MW-1 and TMW-2; total cadmium in MW-3 and total lead in TMW-1 and TMW-2 were detected at concentrations that exceeded their respective EPA MCL/RSL. The MCL exceedances at TMW-1 and TMW-2 were likely affected by the elevated turbidity at TMW-1 (315 NTU) and TMW-2 (>1000 NTU) at the time of sampling. As previously discussed, TMW-1 and TMW-2 were initially installed as a temporary monitoring location to address the elevated chloride detections at MW-3. According to the USEPA SESD

guidance document titled "Design and Installation of Monitoring Wells", temporary wells are cost effective, may be installed quickly, and provide a synoptic picture of groundwater quality and are generally installed, purged, sampled, removed, and backfilled in a matter of hours. TMW-1, TMW-2, and TMW-3 were constructed with a traditional filter pack, which can mix with the muddy water in the borehole and may increase the amount of time needed to purge the well to an acceptable level of turbidity. The USEPA SESD guidance document also states that turbidity levels may be reduced by low flow purging and sampling techniques. Although low flow purging and sampling techniques were used to purge TMW-1 and TMW-2, it appears that the well may require further development activities during future monitoring events before the observed turbidity values observed at TMW-1 and TMW-2 will be reduced.

Total cadmium was detected in MW-3 at a concentration of 0.00659 mg/l during the December 14, 2017 sampling event. The MCL for total cadmium is 0.005 mg/l. Total cadmium had not been detected above the laboratory PQL (0.001) before November of 2016. Also, total cadmium was detected above the MCL on September 28, 2017 (0.00926 mg/l), August 8, 2017 (0.0113 mg/l) and June 8, 2017 (0.0286 mg/l). The Mann-Kendall trend analysis produced a statistically significant upward trend in total cadmium concentrations reported at MW-3. Due to the identified total cadmium detections above the MCL at MW-3 in June 2017, August 2017, September 2017, and December 2017, groundwater samples will continue to be collected from temporary monitoring wells down-gradient from MW-3. Also, surface water samples and sediment samples will continue to be collected at selected locations along Charlie Creek and Cane Creek and analyzed for total and dissolved metals.

Total Arsenic was detected in up-gradient MW-1 (0.0573 mg/l) and in down-gradient temporary well TMW-2 (0.0131 mg/l). The MCL for arsenic is 0.01 mg/l. Arsenic has historically been detected at concentrations exceeding the primary drinking water MCL prior to the disposal of waste in the landfill. Laboratory analytical testing of groundwater samples taken from MW-1 during background testing of the groundwater prior to waste placement in the landfill revealed concentrations of arsenic ranging from 0.024 mg/L to 0.072 mg/L. The arsenic detection at TMW-2 was likely affected by the elevated turbidity at the time of sampling and is supported by the fact that the dissolved arsenic concentration at TMW-2 were below the laboratory PQL (<0.002 mg/l). The presence of arsenic in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden, since there is no immediate development up-gradient of MW-1.

Total Cobalt was detected in up-gradient well MW-1 (0.0411 mg/L) and in down-gradient well MW-5 (0.00245 mg/L). Cobalt does not have an MCL; however, TDEC-DSWM has indicated that they are using the EPA regional screening level (RSL) of 0.006 mg/L as the groundwater protection standard for this constituent. The reported detection at up-gradient MW-1 is above the RSL. Cobalt has historically been detected at concentrations that exceed the RSL at MW-1 prior to the disposal of waste in the landfill. The presence of cobalt in the local groundwater is considered to be

naturally occurring, originating from deposits in the soil overburden, since there is no immediate development up-gradient of MW-1.

Total Lead was detected in down-gradient TMW-1 (0.00384 mg/l) and TMW-2 (0.0305 mg/l). The MCL for lead is 0.015 mg/l. The total lead detections at TMW-1 and TMW-2 were likely affected by the elevated turbidity at the time of sampling and is supported by the fact that the dissolved lead concentrations at TMW-1 and TMW-2 were below the laboratory PQL (<0.002 mg/l).

6.2 EWS GROUNDWATER QUALITY RELATIVE TO THE NATIONAL SECONDARY DRINKING WATER STANDARDS

Laboratory analytical results for the groundwater samples collected in December of 2017 from the former EWS Class II Landfill groundwater monitoring well network indicated that three of the site-specific groundwater monitoring list of compounds were detected at concentrations which exceeded the National Secondary Drinking Water Standards (2DWS). Those parameters included iron and manganese in up-gradient well MW-1, aluminum in TMW-1, TMW-2, and TMW-3, and manganese in down-gradient wells MW-3, MW-5, TMW-1, and TMW-3.

The 2DWS exceedances observed at TMW-1, TMW-2, and TMW-3 were likely affected by the elevated turbidity at TMW-1 (315 NTU), TMW-2 (>1000 NTU), and TMW-3 (38.6 NTU) at the time of sampling. As previously discussed, TMW-1, TMW-2, and TMW-3 were initially installed as temporary monitoring locations to address the elevated chloride detections at MW-3. According to the USEPA SESD guidance document titled "Design and Installation of Monitoring Wells", temporary wells are cost effective, may be installed quickly, and provide a synoptic picture of groundwater quality and are generally installed, purged, sampled, removed, and backfilled in a matter of hours. TMW-1, TMW-2, and TMW-3 were constructed with a traditional filter pack which can mix with the muddy water in the borehole, which may increase the amount of time needed to purge the well to an acceptable level of turbidity. The USEPA SESD guidance document also states that turbidity levels may be reduced by low flow purging and sampling techniques. Although low flow purging and sampling techniques were used to purge TMW-2, it appears that the well may require further development activities during future monitoring events before the observed turbidity values observed at TMW-1, TMW-2, and TMW-3 will be reduced.

Total Aluminum concentrations observed in MW-3 (0.948 mg/l), TMW-1 (1.15 mg/l), TMW-2 (28.5 mg/l), and TMW-3 (0.273 mg/L) during the December 2017 sampling event were above the 2DWS (0.2 mg/L). However, the aluminum concentrations observed at MW-3, TMW-1, and TMW-3 remain less than the highest concentrations observed in up-gradient well MW-1 (1.2 mg/L) and down-gradient well MW-3 (1.8 mg/L) prior to accepting waste within the landfill. The total aluminum detections at TMW-1 and TMW-2 were likely affected by the elevated turbidity at the time of sampling and is supported by the fact that the dissolved aluminum concentrations at TMW-1 (dissolved aluminum=0.128 mg/l) and TMW-2 (dissolved aluminum=0.329 mg/l) were

significantly lower in concentration. It should also be noted that although each sample was field-filtered using a 0.45 micron filter before sample collection, the turbidity at TMW-1 (245 NTU) and TMW-2 (283 NTU) remained elevated after field filtering, indicating that very small (<0.45 micron) colloidal clay particles were able to pass through the filter and remain in the water column.

Total Iron was detected at a concentration of 26 mg/L in MW-1 and 1.6 mg/L in MW-3 prior to the placement of waste. Iron was detected above the 2DWS (0.3 mg/l) in MW-1 (14.3 mg/L), MW-3, MW-5 (0.50 mg/L), TMW-1 (3.79 mg/l), TMW-2 (39.3 mg/l), and TMW-3 (1.35 mg/l) during the December 2017 monitoring event. The reported total iron concentrations at MW-1, MW-5, TMW-1, and TMW-3 were less than the highest concentrations observed prior to placement of waste and do not exhibit a trend via time-series graphs. Similar to the total aluminum concentrations, the total iron concentration at TMW-1, TMW-2, and TMW-3 were likely caused by the elevated turbidity values at each of the temporary monitoring wells. In addition, the presence of iron in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden, and iron has consistently been detected above the 2DWS in MW-1.

Total Manganese has been consistently detected in up-gradient well MW-1 and the highest reported concentration was observed during the May 2016 monitoring event (0.952 mg/L). Manganese detections were observed in up-gradient MW-1 (0.921 mg/L) and down-gradient site monitoring wells MW-3 (0.234 mg/L), MW-4 (.0278 mg/L), MW-5 (0.0728mg/L), TMW-1 (0.0641 mg/l), and TMW-2 (0.312 mg/l). The presence of total manganese in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden, and total manganese has consistently been detected above the 2DWS (0.05 mg/l) in MW-1.

Sulfate concentrations currently exhibit an increasing trend in MW-3 when considering all data accumulated from MW-3 since May 19, 2009. The sulfate concentration reported at MW-3 during this sampling event was 46.2 mg/L, was below the 2DWS for sulfate concentrations (250 mg/L), was less than the concentrations reported during the second quarter monitoring event in September 2017 (93.7 mg/), and were equal to the previous September 2017 event (46.2 mg/l). The sulfate concentrations at MW-3 will continue to be closely monitored during future quarterly assessment monitoring events. Sulfate was not detected above the PQL in any of the other monitoring wells across the site.

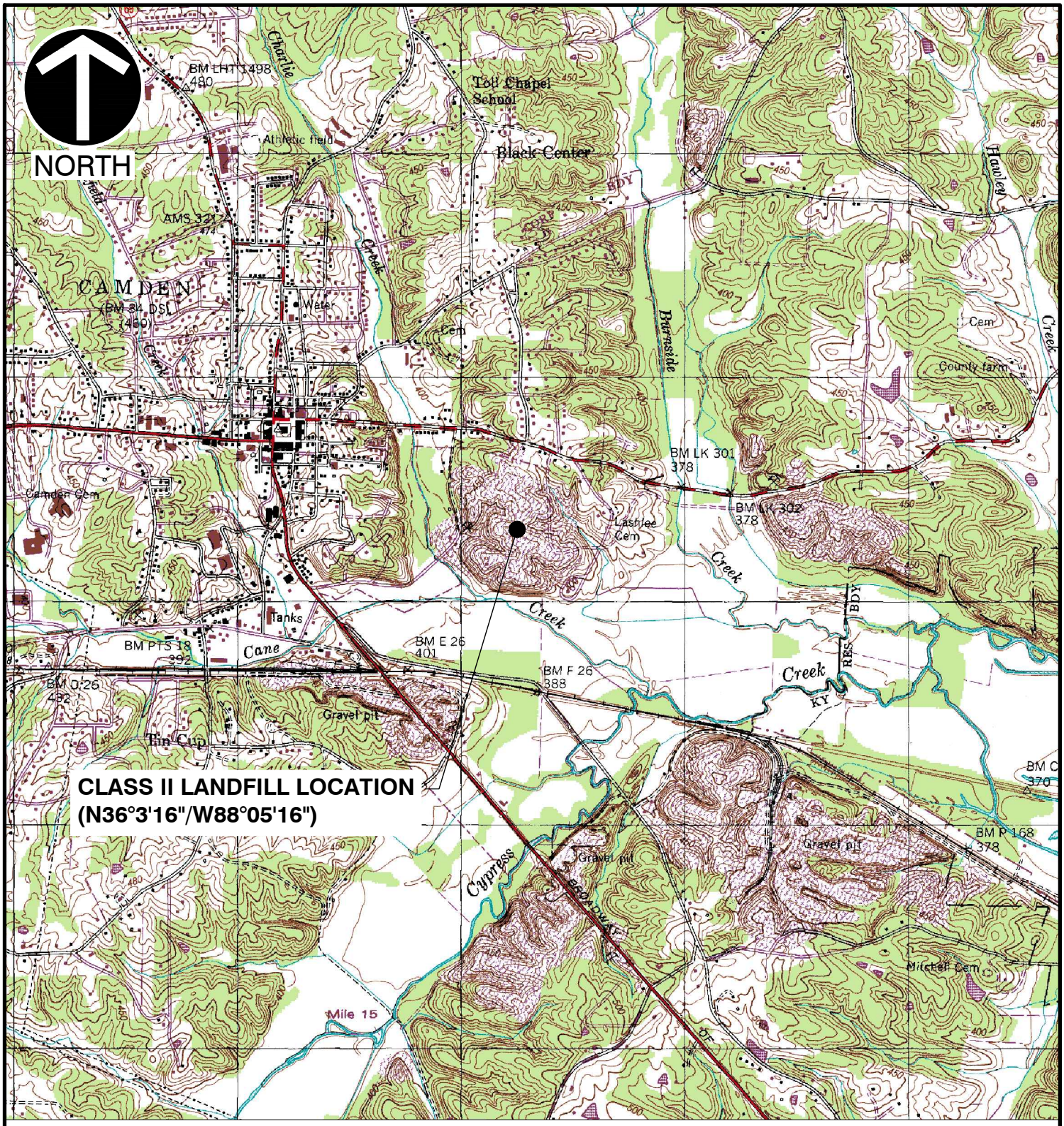
The first quarter 2018 assessment monitoring event is tentatively scheduled for March 2018 and will consist of collecting groundwater samples from up-gradient well MW-1 and down-gradient wells MW-3, MW-4, MW-5, TMW-1, TMW-2, TMW-3, and surface water and sediment samples from selected locations along Charlie Creek and Cane Creek. Collected samples will be analyzed for chloride, appendix I metals (total and dissolved), sulfate and additional leachate indicator parameters (alkalinity, ammonia, COD, calcium, iron, magnesium, manganese, potassium, sodium, and nitrate).

7.0 RECOMMENDATIONS

The following recommendations are presented in an effort to effectively identify the source(s) of the elevated total cadmium in MW-3, as well as the sources for elevated total barium, chloride, sulfate, lead and zinc concentrations in the given wells as detailed in the previous section. In addition, these recommendations are given in an effort to insure the continuance of securing representative groundwater samples and to obtain analytical results with a high-degree of accuracy and precision (i.e., repeatability).

1. It is recommended that dedicated low-flow pumps that were installed within monitoring wells MW-1, MW-4, MW-5, and TMW-3 be utilized during the next scheduled sampling event. Although low flow purging and sampling techniques were used to purge TMW-1 and TMW-2, it appears that the wells will require further development activities during future monitoring events.
2. It is recommended that MW-3 be purged and sampled using traditional purge methods during the next quarterly monitoring events and, specifically, when the height of the water column residing in MW-3 remains less than 10 feet. Low-flow purging and sampling methods yield a more representative groundwater sample when the well screen is not dewatered. Dewatering of the well screen exposes formation water to air and gases in the well and affects groundwater chemistry. This may also explain the elevated turbidity values observed during the initial low-flow purging activities at MW-3 on December 11, 2017, since recharging groundwater would trickle down the inner side of the screened area which would continually agitate the water within the well after each purge cycle. Since the water within the well was not static during purging, the turbidity remained elevated and a representative sample could not be obtained. Therefore, the traditional purge methods may be utilized during future events.
3. It is recommended that all monitoring wells on the site continue to be monitored quarterly. In addition, quarterly groundwater samples will continue to be collected from temporary monitoring wells down-gradient from MW-3. Also, surface water samples and sediment samples will continue to be collected at selected locations along Charlie Creek and Cane Creek and analyzed for total and dissolved metals during future quarterly assessment monitoring activities.
4. It is recommended that the chosen analytical laboratory (ESC) continue to run methods for total and dissolved metal constituents, using methods that will produce the lowest reporting limit. In addition to providing results for dissolved metals in the case where certain groundwater samples have turbidities that are above 10 NTUs, having a growing database of dissolved metal constituents is essential, if there is a future need for groundwater modeling.

APPENDIX A
MAPS & TABLES



REFERENCE

1. U.S.G.S. 7.5' TOPOGRAPHIC MAP, CAMDEN QUADRANGLE, TENN. DATED: 1950, PHOTOREVISED: 1984.

SCALE IN FEET

0 2000' 4000'

* HAND SIGNATURE ON FILE

Civil & Environmental Consultants, Inc.

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EWS SITE
CLASS II CAMDEN LANDFILL
CAMDEN, TENNESSEE

SITE LOCATION MAP

DRAWN BY:	KLU	CHECKED BY:	PC	APPROVED BY:	KBW*	FIGURE NO.:	1
DATE:	February 2018	DWG SCALE:	1"=2000'	PROJECT NO:	171-873		

P:\2017\171-873\-CADD\Dwg\Groundwater\171-873 SITE LOCATION MAP.dwg{LAYOUT1} LS:(2/6/2018 - pcampbell) - LP: 2/6/2018 10:02 AM

NORTH

LEGEND

MW1 392.60	GROUND WATER MONITORING WELL GROUND WATER ELEVATION (FMSL)
TMW-1 373.84	TEMPORARY GROUND WATER MONITORING WELL GROUND WATER ELEVATION (FMSL)
390	POTENTIOMETRIC SURFACE CONTOUR (FMSL)
	GROUND WATER FLOW DIRECTION
MH1	MANHOLE
	APPROXIMATE FILL LIMITS
FM	LEACHATE FORCE MAIN

MW-1 393.48
392
387
382
377
372
SW OUTFALL 001 (LOCATION APPROXIMATE)
IWC LEACHATE SAMPLING LOCATION
EXISTING PHASE 4A
INDUSTRIAL WASTE CELL (IWC)
APPROXIMATE LOCATION (NOT AS-BUILTED DURING CONSTRUCTION)
(RIP-RAP) EMERGENCY SPILL WAY
RIP-RAP
MW-5 375.84
ALUMINUM PROCESSING WASTE CELL (APWC)
EXISTING PHASE 2A
EXISTING PHASE 3A
MW-3 373.03
TMW-1 372.49
TMW-2 372.67
TMW-3 371.52
MW-2 374.24
MW-4 369.72
MH2
MH-1
AIR RELEASE VALVE
POND
APWC LEACHATE SAMPLING LOCATION
SW OUTFALL 002 (LOCATION APPROXIMATE)
BENCHMARK N=632030.54 E=1352175.74 SPIKE IN POWER POLE EL=389.0

NOTE:

Hydraulic gradient calculation between MW-1 and MW-4 locations.

$$i = \frac{393.48' \text{ (MW-1)} - 369.72' \text{(MW-4)}}{1{,}910'} = 0.0124 \text{ ft/ft}$$

GROUNDWATER CONDITIONS

THE WATER LEVELS PRESENTED HEREIN ARE APPLICABLE TO THE LOCATION AND TIME OF MEASUREMENT. WATER LEVELS MAY FLUCTUATE THROUGH TIME.

POTENTIOMETRIC CONTOURS GENERATED FROM THESE DATA ARE CONSTRUCTED BY INTERPOLATION BETWEEN POINTS OF KNOWN STATIC WATER LEVEL ELEVATIONS AND USING KNOWLEDGE OF SPECIFIC SITE CONDITIONS. ACTUAL STATIC WATER LEVELS AT LOCATIONS BETWEEN THE MONITORING POINTS MAY DIFFER FROM THOSE DEPICTED.

SCALE IN FEET
0 200 400

*HAND SIGNATURE ON FILE

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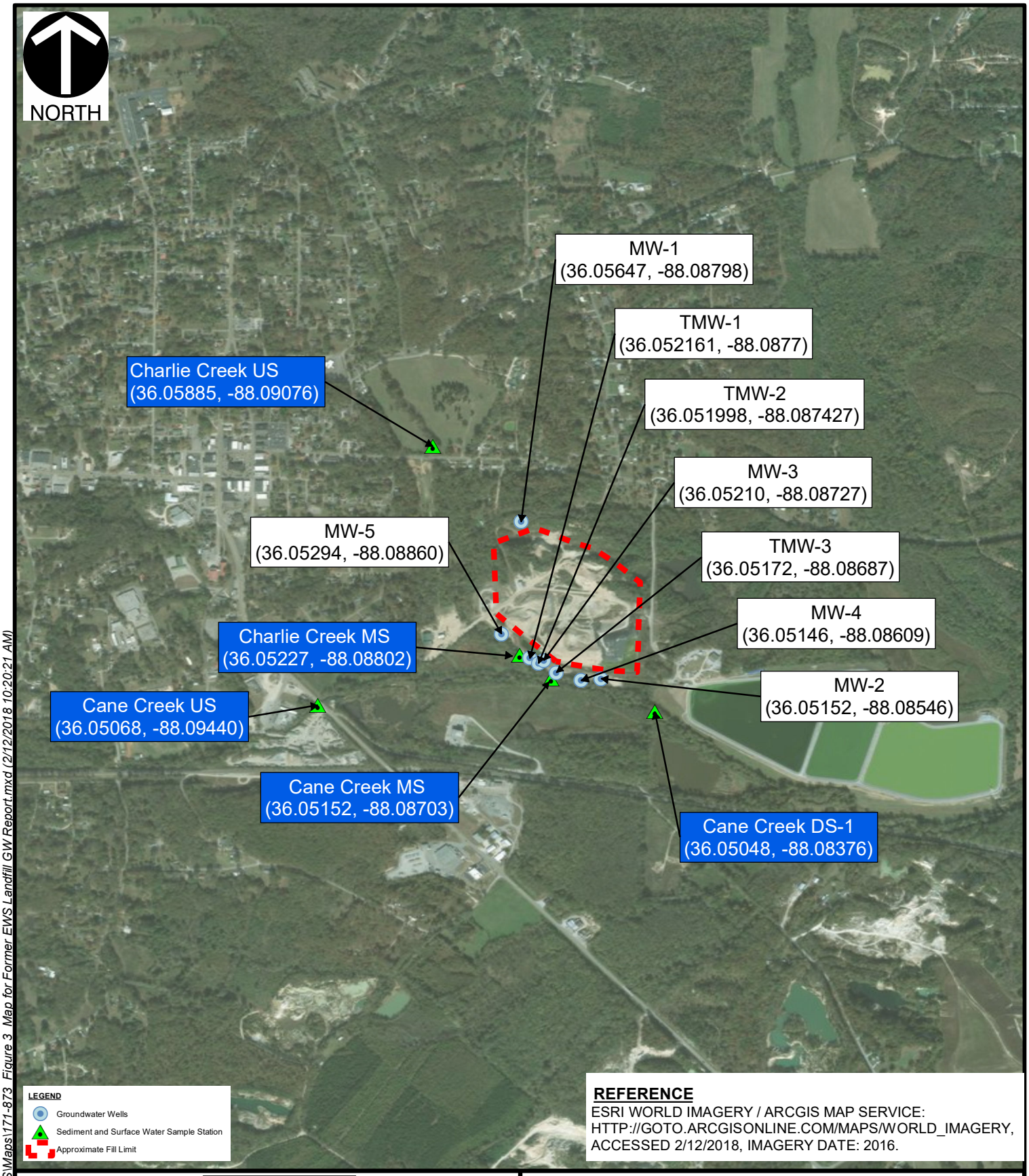
ENVIRONMENTAL WASTE SOLUTIONS
CAMDEN CLASS II LANDFILL
CAMDEN, TENNESSEE

DECEMBER 2017
POTENTIOMETRIC SURFACE MAP

DRAWN BY:	AB	CHECKED BY:	PC	APPROVED BY:	*KBW	FIGURE NO.:	2
DATE:	FEBRUARY 2017	DWG SCALE:	1"=200'	PROJECT NO:	171-873		



\\SVR-NASH\P:\2017\171-873\-GIS\Maps\171-873 Figure 3 Map for Former EWS Landfill GW Report.mxd (2/12/2018 10:20:21 AM)

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FORMER EWS SITE
CLASS II CAMDEN LANDFILL
CAMDEN, BENTON COUNTY, TN

GROUNDWATER AND STREAM SAMPLE LOCATIONS

DRAWN BY:	RLP	CHECKED BY:	PJC	APPROVED BY:	KBW* * Hand signature on file	FIGURE NO:	3
DATE:	FEBRUARY 2018	SCALE:	1 " = 1,500 '	PROJECT NO:	171-873		

Table 1

Former Environmental Waste Solutions Camden Class II Landfill

Field Parameters and Potentiometric Data - December 2017

Monitoring Well/ Sample Location	Date	Sample Time	Top of Casing Elevation[1] (Feet MSL)	Bottom of Well Elevation (Feet)	Well Diameter (Feet)	Well Volume Gallons	Depth to Water (Feet)[2]	Potentiometric Surface (Feet MSL)	Temperature (˚C)	Conductivity (micromhos/cm)	pH (SU)	Dissolved Oxygen (mg/l)	Oxidation Reduction Potential (Millivolts)	Turbidity (NTU)
MW-1	12/11/2017	11:00	416.47	385.97	0.17	1.3	22.99	393.48	15.9	110.9	5.66	0.24	73.0	4.06
MW-2*	12/11/2017	11:20	380.35	367.70	0.17	1.1	6.11	374.24	22.8	256.3	5.98	2.21	-23.8	353.0
MW-3	12/14/2017	16:00	392.90	365.10	0.17	1.3	19.87	373.03	14.2	529.0	5.42	4.72	93.4	23.0
MW-4	12/11/2017	17:00	381.47	358.37	0.17	1.9	11.75	369.72	16.2	81.6	5.77	2.71	91.7	5.33
MW-5	12/11/2017	12:10	385.25	351.40	0.17	4.1	9.41	375.84	16.5	239.7	5.33	0.88	100.0	22.0
TMW-1	12/11/2017	13:45	381.19	348.99	0.085	1.0	8.70	372.49	16.0	94.4	5.67	4.28	94.6	315
TMW-2	12/11/2017	15:15	384.27	356.77	0.085	0.7	11.60	372.67	16.1	94.8	5.68	5.01	93.9	>1000
TMW-3	12/11/2017	16:10	381.37	353.37	0.085	0.8	9.85	371.52	15.7	205.1	5.35	1.59	103.3	38.6
Charlie Creek US	12/11/2017	14:00	NA	NA	NA	NA	NA	NA	6.8	94.7	5.40	17.47	76.2	3.20
Cane Creek US	12/11/2017	13:30	NA	NA	NA	NA	NA	NA	5.7	279.2	5.39	13.84	72.4	6.71
Charlie Creek MS	12/11/2017	12:50	NA	NA	NA	NA	NA	NA	5.6	174.1	5.44	16.52	62.1	3.01
Cane Creek MS	12/11/2017	12:10	NA	NA	NA	NA	NA	NA	4.9	160.4	5.04	13.97	84.5	5.33
Cane Creek DS-1	12/11/2017	11:35	NA	NA	NA	NA	NA	NA	4.2	149.8	5.23	14.96	73.7	3.24
Leachate (IWC-L)	12/12/2017	10:15	NA	NA	NA	NA	NA	NA	9.0	69,267	3.60	3.20	271.1	50.4
Leachate (APWC-L)	12/12/2017	10:45	NA	NA	NA	NA	NA	NA	50.4	498,184	9.03	0.13	-23.8	10.20

[1] Top of Casing Elevations from survey by Civil & Environmental Consultants, Inc. on May 12, 2016.

[2] Depth to water measurements collected by Civil & Environmental Consultants, Inc. on December 11, 2017

* - MW-2 has been removed from monitoring network. Only water level and field parameters collected at MW-2.

NS= Not Sampled

NA= Not Applicable.

Table 2a
Former EWS Camden Class II Landfill IDL 03-0212 (Terminated)
Inorganic Analytical Data -December 2017

		MW-1		MW-3		MW-4		MW-5		TMW-1		TMW-2		TMW-3		Field Blank		Leachate IWC-L		Leachate-APWC-L	
		12/11/2017		12/14/2017		12/11/2017		12/11/2017		12/11/2017		12/11/2017		12/11/2017		12/11/2017		12/12/2017		12/12/2017	
Parameter	**MCL/GWPS (mg/l)**	**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**	
Hardness	-	<30		**127**		<30		**76.9**		**37.8**	B	**69.1**		**71.4**		<30		**27900**		**955**	
Alkalinity	-	**52**		<20		<20		<20		<20		<20		<20		<20		<20		**23,500**	
Ammonia Nitrogen	-	0.1	P1	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		**1,030**		**7,750**	
COD	-	<10		**16.7**		<10		<10		33.8		74		<10		<10		**1,350**		**25,000**	
Boron	-	<0.2		<0.2		<0.2		<0.2		<0.2		<0.2		<0.2		<0.2		<1		**8.84**	
Bromide	-	<1		<1		<1		<1		<1		<1		<1		<1		<1		**179**	
Chloride	250 [2]	**2.31**		**104**		**6.76**		**52.5**		**9.92**		**12.4**		**43.6**		<1		<1		**146,000**	
Fluoride	2 [2]	<0.1		**0.149**		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1	
Nitrate	10	<0.1	T8	**5.76**		**0.504**		**1.10**	T8	**1.41**		**0.664**		**3.43**		<0.1		<0.1		**4.37**	
Sulfate	250 [2]	<5		**46.2**		<5		<5		<5		<5		<5		<5		<5		**1,240**	
Aluminum	0.2 [2]	<0.1		**0.948**		<0.1		**0.188**		**1.15**		**28.5**		**0.275**		<0.1		**279.0**		<0.9	
Aluminum, Dissolved		<0.1		<0.1		<0.1		<0.1		**0.128**		**0.329**		<0.1		<0.1		**278.0**		<2	
Antimony	0.006	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.2		<0.18	
Arsenic	0.01	**0.0573**		<0.002		<0.002		<0.002		**0.00329**		**0.0131**		<0.002		<0.002		**0.247**		0.021	
Arsenic, Dissolved		**0.0624**		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**0.242**		<0.04	
Barium	-	**0.0166**		**0.119**		**0.00769**		**0.0286**		**0.0259**		**0.434**		**0.0361**		<0.005		**0.95**		**1.89**	B
Barium, Dissolved	-	**0.0167**		**0.112**		**0.00749**		**0.0255**		**0.0116**		**0.0466**		**0.0341**		<0.005		**0.98**		**2.1**	
Beryllium	0.004	<0.002		<0.002		<0.002		<0.002		<0.002		0.00205		<0.002		<0.002		**<0.2**		<0.018	
Beryllium, Dissolved		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**<0.2**		<0.04	
Cadmium	0.005	<0.001		**0.00659**		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		**375**		**0.219**	
Cadmium, Dissolved	0.005	<0.001		**0.00733**		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		**363**		**0.354**	
Calcium	-	**3.31**		**26.9**		**4.31**		**12.7**		**8.07**		**12.1**		**16.5**		<1		**3,450**		**280**	
Calcium, Dissolved	-	**3.33**		**26.3**		**4.32**		**12.7**		**7.98**		**7.02**		**16.6**		<1		**3,340**		**299**	
Chromium	0.1	<0.002		<0.01		<0.002		<0.002		**0.00725**		**0.0367**		<0.002		<0.002		<0.2		<0.018	
Chromium, Dissolved		<0.002		<0.01		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.2		<0.04	
Cobalt	0.006 [3]	**0.0411**		<0.01		<0.002		**0.00245**		<0.002		0.00755		<0.002		<0.002		**1.93**		**0.0464**	
Cobalt, Dissolved	-	**0.045**		<0.01		<0.002		**0.00223**		<0.002		<0.002		<0.002		<0.002		**1.94**		**0.0515**	
Copper	1.3	<0.005		**0.00583**		<0.005		<0.005		0.0109		0.0241		<0.005		<0.005		**43.4**		**11.6**	
Copper, Dissolved		<0.005		**0.00706**		<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		**41.6**		**12.8**	
Iron	0.3 [2]	**14.3**		0.239		**0.178**		**0.5**		**3.79**		**39.3**		**1.35**		<0.1		**310**		<0.9	
Iron, Dissolved	0.3 [2]	**16**		<0.1		<0.1		<0.1		**0.403**		**0.174**		<0.1		<0.1		**293**		<2	
Lead	0.015	<0.002		<0.002		<0.002		<0.002		**0.00384**		**0.0305**		<0.002		<0.002		**0.384**		<0.18	
Lead, Dissolved		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**0.38**		<0.04	
Magnesium	-	**2.69**		**12.8**		**2.61**		**8.62**		**2.24**		**6.62**		**5.41**		<1		**2,300**		<9	
Magnesium, Dissolved	-	**2.83**		**11.7**		**2.75**		**8.62**		**2.28**		**2.69**		**5.43**		<1		**2,360**		<20	
Manganese	0.05 [2]	**0.921**		**0.234**		**0.0278**		**0.0728**		**0.0641**		**0.312**		**0.0233**		<0.005		**609**		**0.303**	
Manganese, Dissolved	0.05 [2]	**1.03**		NA		**0.0308**		**0.0726**		**0.0206**		**0.00688**	B	**0.0152**		<0.005		**617**		**0.135**	B
Nickel	0.10 [1]	**0.00652**		<0.01		<0.002		**0.0211**		**0.00362**		**0.0189**		**0.00202**		<0.002		**1.67**		**0.592**	
Nickel, Dissolved		**0.00611**		<0.01		<0.002		**0.0237**		<0.002		<0.002		**<0.002**		<0.002		**1.7**		**0.68**	
Potassium	-	**1.22**		**22.5**		<1		**1.73**		**1.13**		**2.52**		**1.53**		<1		**5,470**		**64,100**	
Potassium, Dissolved	-	**1.29**		**21.1**		<1		**1.19**		<1		<1		**1.51**		<1		**5,700**		**54,900**	
Selenium	0.05	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**0.496**		<0.18	
Selenium, Dissolved		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		**0.885**		<0.04	
Silver	0.10 [2]	<0.002		<0.005		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.2		<0.18	
Sodium	-	**3.23**		**42.9**		**3.90**		**14.8**		**3.23**		**3.41**		**8.61**		<1		**10,200**		**88,600**	
Sodium, Dissolved	-	**3.18**		**40.7**		**3.85**		**14.9**		**3.09**		**3.27**		**8.82**		<1		**10,500**		**92,100**	
Thallium	0.002	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.2		<0.18	
Vanadium	-	<0.005		<0.02		<0.005		<0.005		**0.00942**		**0.0747**		<0.005		<0.005		<0.5		**0.0725**	
Vanadium, Dissolved		<0.005		<0.02		<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		<0.5		<0.1	
Zinc	5 [2]	<0.025		**0.159**		<0.025		<0.025		<0.025		**0.093**		<0.025		<0.025		**4,300**		**33.9**	
Zinc, Dissolved	5 [2]	<0.025		**0.0485**		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		**3,760**		**39.6**	
Mercury	0.002	**0.000473**		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.002		<0.002	
Mercury, Dissolved	0.002	**0.00022**	B	<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		**0.00207**	B	<0.002	

Notes:

MCL: Maximum Contaminant Level Enforceable National Primary Drinking Water Standards

GWPS: Groundwater Protection Standard

[1] - MCL value obtained from TN Division of Water Supply rule 1200-5-.06(1)(b)11

[2] - MCL value obtained from TN Division of Water Supply rule 1200-5-1-.12(1)(n). (EPA Secondary Drinking Water Standard)

[3] - GWPS value is referenced from EPA Regional Screening Level for Cobalt

NA-Not Analyzed by the Laboratory.

Bold text indicates laboratory analytical detections above the practical quantitation level

Dark gray shaded text indicates detection above respective MCL/GWPS

Light gray shaded text indicates detection above respective Non-Enforceable National Secondary Drinking Water Standard.

B-The same analyte is found in the associated blank

P1-RPD value not applicable for sample concentrations less than 5 times the reporting limit.

T8-Sample(s) received past/too close to holding time expiration

Table 2b
Former EWS Camden Class II Landfill IDL 03-0212 (Terminated)
Inorganic Analytical Data -September 2017

	Stream Samples (Water)										Sediment Samples (Solids)					
	Charlie Creek US		Charlie Creek MS		Cane Creek US		Cane Creek MS		Cane Creek DS-1		Charlie Creek US		Charlie Creek MS		Cane Creek US		Cane Creek MS		Cane Creek DS-1	
	12/11/2017		12/11/2017		12/11/2017		12/11/2017		12/11/2017		12/11/2017		12/11/2017		12/11/2017		12/11/2017		12/11/2017	
Parameter	**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/kg)**		**Value (mg/kg)**		**Value (mg/kg)**		**Value (mg/kg)**		**Value (mg/kg)**	
Total Hardness	**46.6**		**54.9**		**89.5**		**80.1**		**80.5**		NA		NA		NA		NA		NA	
Boron	<0.2		<0.2		<0.2		<0.2		<0.2		<10		<10		<10		<10		<10	
Bromide	<1	P1	<1		<1		<1		<1		<10		<10		<10		<10		<10	
Chloride	**8.27**		**10.9**		**11.4**		**11.6**		**12.7**		**44.6**		**53.8**		**49.0**		**50.2**		<10	
Fluoride	<0.1		<0.1		<0.1		<0.1		<0.1		**1.68**		**4.39**		**1.35**		**1.93**		<1	
Aluminum	<1		<0.1		<0.1		<0.1		<0.1		**727**		**1970**		**839**		**830**		**468**	
Antimony	<0.002		<0.002		<0.002		<0.002		<0.002		<2		<2		<2		<2		<2	
Arsenic	<0.002		<0.002		<0.002		<0.002		<0.002		<2		<2		<2		<2		<2	
Barium	**0.0284**		**0.0312**		**0.034**		**0.0331**		**0.0346**		**5.74**		**13.10**		**4.98**		**9.83**		**4.02**	
Barium (Dissolved-LF)	**0.0297**		**0.0331**		**0.0325**		**0.0345**		**0.0358**		NA		NA		NA		NA		NA	
Beryllium	<0.002		<0.002		<0.002		<0.002		<0.002		<0.2		<0.2		<0.2		<0.2		<0.2	
Total Cadmium	**0.00375**		**0.002**		<0.001		<0.001		<0.001		<0.5		<0.5		<0.5		<0.5		<0.5	
Cadmium (Dissolved-LF)	**0.00227**		<0.001		<0.001		<0.001		<0.001		NA		NA		NA		NA		NA	
Calcium	**10.9**		**13.2**		**18.1**		**18.8**		**18.9**		<100		**226**		**382**		<100		<100	
Calcium (Dissolved-LF)	**12.2**		**14.8**		**20.3**		**19.1**		**19.2**		NA		NA		NA		NA		NA	
Chromium	<0.002		<0.002		<0.002		<0.002		<0.002		**3.44**		**3.42**		**29**		**4.88**		**5.58**	
Cobalt	<0.002		<0.002		**0.00226**		<0.002		<0.002		<1		**1.36**		**1.52**		**1.28**		<1	
Cobalt (Dissolved-LF)	<0.002		<0.002		<0.002		<0.002		<0.002		NA		NA		NA		NA		NA	
Copper	<0.05		**0.00516**		<0.005		<0.005		<0.005		<2		<2		<2		<2		<2	
Copper, (Dissolved-LF)	<0.005		<0.005		<0.005		<0.005		<0.005		NA		NA		NA		NA		NA	
Iron	<1		**0.417**		**0.92**		**0.709**		**0.736**		**2370**		**3300**		**6490**		**3170**		**1270**	
Iron (Dissolved-LF)	**0.111**		**0.121**		**0.121**		**0.134**		**0.168**		NA		NA		NA		NA		NA	
Lead	<0.002		<0.002		<0.002		<0.002		<0.002		**1.6**		**2.79**		**3.66**		**2.16**		**1.4**	
Magnesium	<10		**2.82**		**6.29**		**6.00**		**5.99**		<100		**172.0**		<100		<100		<100	
Magnesium (Dissolved-LF)	**2.53**		**3.08**		**6.82**		**5.74**		**5.8**		NA		NA		NA		NA		NA	
Manganese	**0.128**		**0.317**		**0.735**		**0.515**		**0.525**		**64.7**		**122**		**116**		**107**		**83.8**	
Manganese (Dissolved-LF)	**0.13**		**0.349**		**0.474**		**0.54**		**0.529**		NA		NA		NA		NA		NA	
Nickel	<0.02		<0.002		**0.00409**		**0.003**		**0.0043**		<2		<2		**2.23**		<2		<2	
Nickel, (Dissolved-LF)	<0.002		<0.002		**0.0034**	B	**0.00259**	B	**0.00264**	B	NA		NA		NA		NA		NA	
Potassium	<10		**1.57**		**2.33**		**2.17**		**2.26**		100		**192**		<100		<100		<100	
Potassium (Dissolved-LF)	**1.56**		**1.72**		**2.46**		**2.16**		**2.28**		NA		NA		NA		NA		NA	
Selenium	<0.002		<0.002		<0.002		<0.002		<0.002		<2		<2		<2		<2		<2	
Silver	<0.002		<0.002		<0.002		<0.002		<0.002		<1		<1		<1		<1		<1	
Sodium	<10		**6.39**		**8.23**		**8.49**		**8.76**		<100		<100		<100		<100		<100	
Sodium (Dissolved-LF)	**6.92**		**7.34**		**9.26**		**8.69**		**9.01**		NA		NA		NA		NA		NA	
Thallium	<0.002		<0.002		<0.002		<0.002		<0.002		<2		<2		<2		<2		<2	
Vanadium	<0.005		<0.005		<0.005		<0.005		<0.005		**3.95**		**6.1**		**7.91**		**6.21**		**2.5**	
Zinc	<0.25		<0.025		<0.025		<0.025		<0.025		**5.16**		**12.5**		**14.5**		**11.2**		**5.36**	
Zinc (Dissolved-LF)	<0.025		<0.025		<0.025		<0.025		<0.025		NA		NA		NA		NA		NA	
Mercury	<0.0002		<0.0002		<0.0002		<0.0002		<0.0002		<0.02		<0.02		<0.02		<0.02		<0.02	

Notes:

Bold text indicates laboratory analytical detections above the laboratory practical quantitation level (PQL)
NA: Not Analyzed
(Dissolved-LF): Dissolved metals samples were filtered in the laboratory. Samples were placed into unpreserved sample containers in the field.
Q: (ESC)- Additional QC Info:
B-The same analyte is found in the associated blank
P1-RPD value not applicable for sample concentrations less than 5 times the reporting limit.

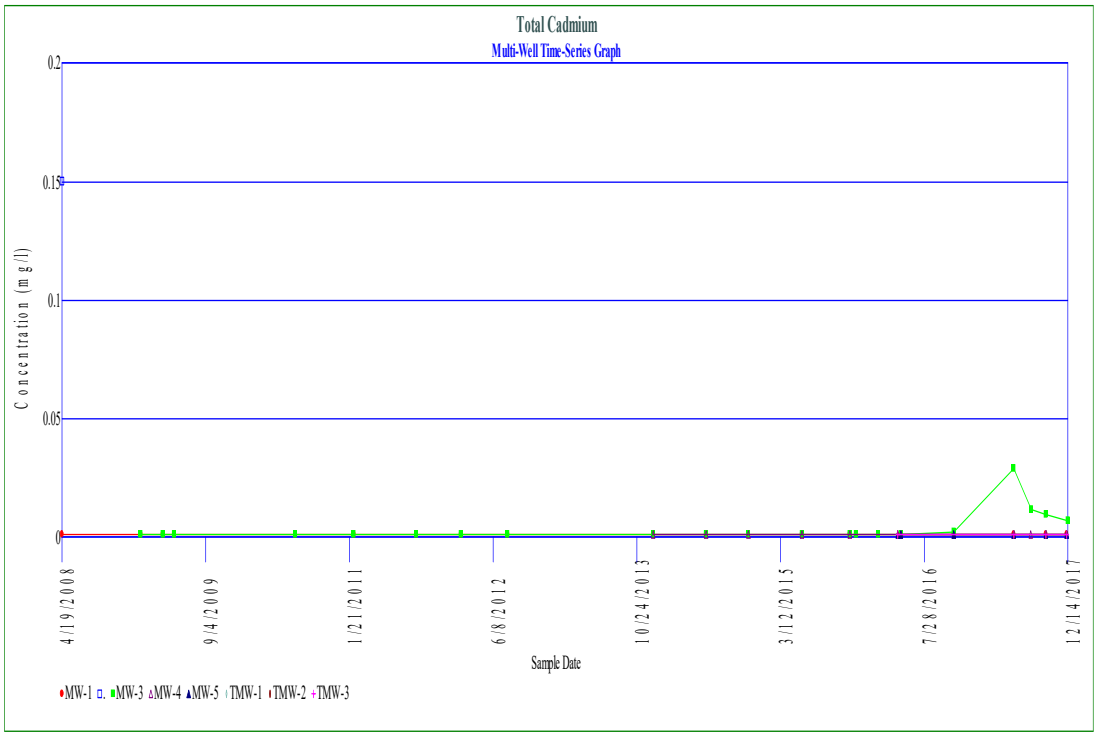
Table 3
Intra-Well and Inter-Well Statistical Summary
Environmental Waste Solutions Camden Class II Landfill IDL 03-0212 (Terminated)
Inorganic Analytical Data -December 2017

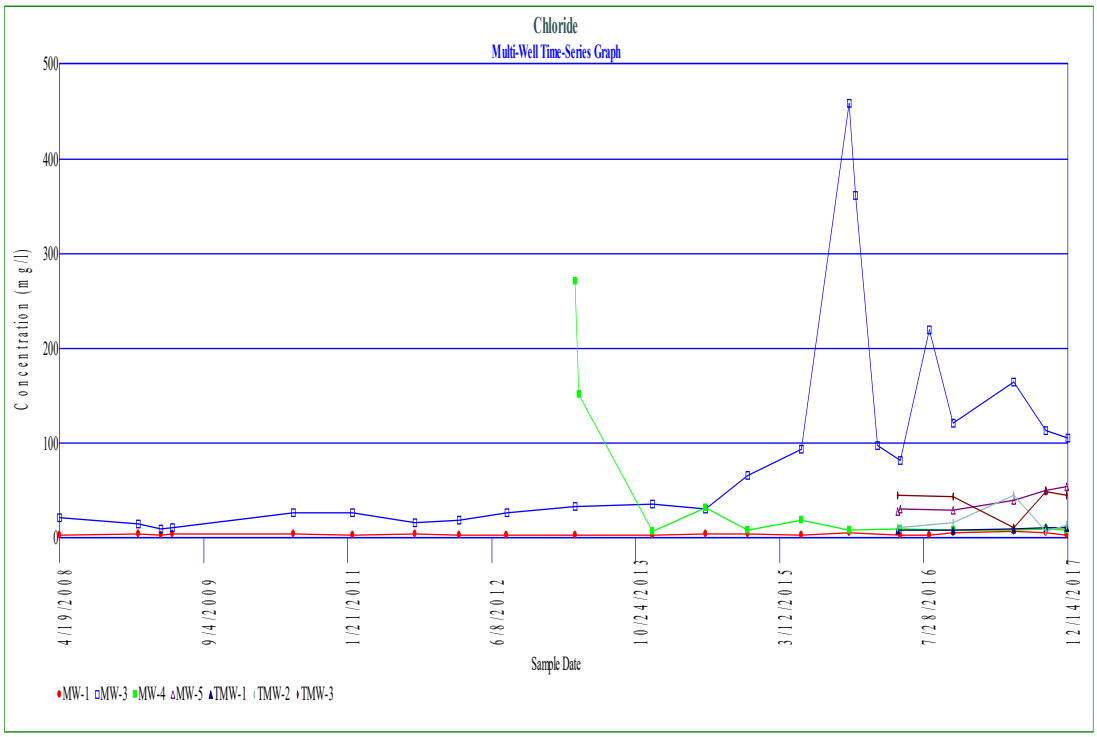
Intra-Well Statistical Summary								
Constituent	Well	% Non Detects	Normality	Intra-well NPPL	Intra-well PPL	Shewhart-Cusum	Wilcoxon Rank Sum	SSI
Arsenic	MW-1	0.00	parametric	--	Pass	--	--	No
Barium	MW-1	0.00	non-parametric	--	--	Pass	--	No
Cobalt	MW-1	0.00	parametric	--	Pass	--	--	No
Nickel	MW-1	63.16	non-parametric	Pass	--	--	--	No
Mercury	MW-1	45.00	non-parametric	--	--	Pass	--	No

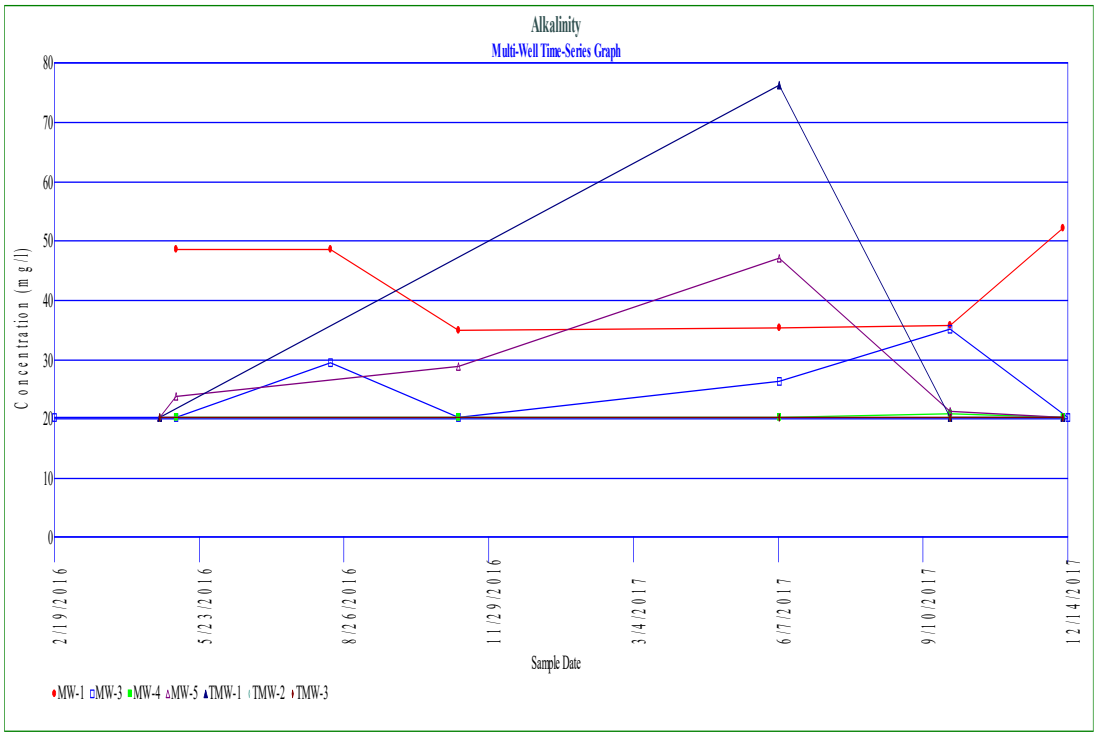
Inter-Well Statistical Summary									
Constituent	Well	Total % Non Detects	Normality	Inter-well NPPL	Inter-well PPL	Shewhart-Cusum	Wilcoxon Rank Sum	SSI	Mann-Kendall Trend Analysis
Aluminum	MW-3	42.37	non-parametric	--	--	Pass	--	No	Downward Trend
	MW-5		non-parametric	--	--	Pass	--	No	No Trend
Barium	MW-3	0	non-parametric	--	--	**Fail**	**Fail**	**Yes**	**Upward Trend**
	MW-4		non-parametric	--	--	Pass	--	No	Downward Trend
	MW-5		non-parametric	--	--	Pass	--	No	No Trend
Total Cadmium	MW-3	91.23	non-parametric	**Fail**	--	--	N/A*	**Yes**	**Upward Trend**
Chloride	MW-3	0	non-parametric	--	--	**Fail**	**Fail**	**Yes**	**Upward Trend**
	MW-4		non-parametric	--	--	**Fail**	**Fail**	**Yes**	No Trend
	MW-5		non-parametric	--	--	**Fail**	**Fail**	**Yes**	**Upward Trend**
Cobalt	MW-5	55.93	non-parametric	Pass	--	--	--	No	No Trend
Fluoride	MW-3	82.14	non-parametric	Pass	--	--	--	No	No Trend
Nickel	MW-3	71.19	non-parametric	Pass	--	--	--	No	Downward Trend
	MW-5		non-parametric	Pass	--	--	--	No	No Trend
Sulfate	MW-3	47.27	non-parametric	--	--	**Fail**	**Fail**	**Yes**	**Upward Trend**
Zinc	MW-3	54.24	non-parametric	**Fail**	--	--	N/A*	**Yes**	**Upward Trend**

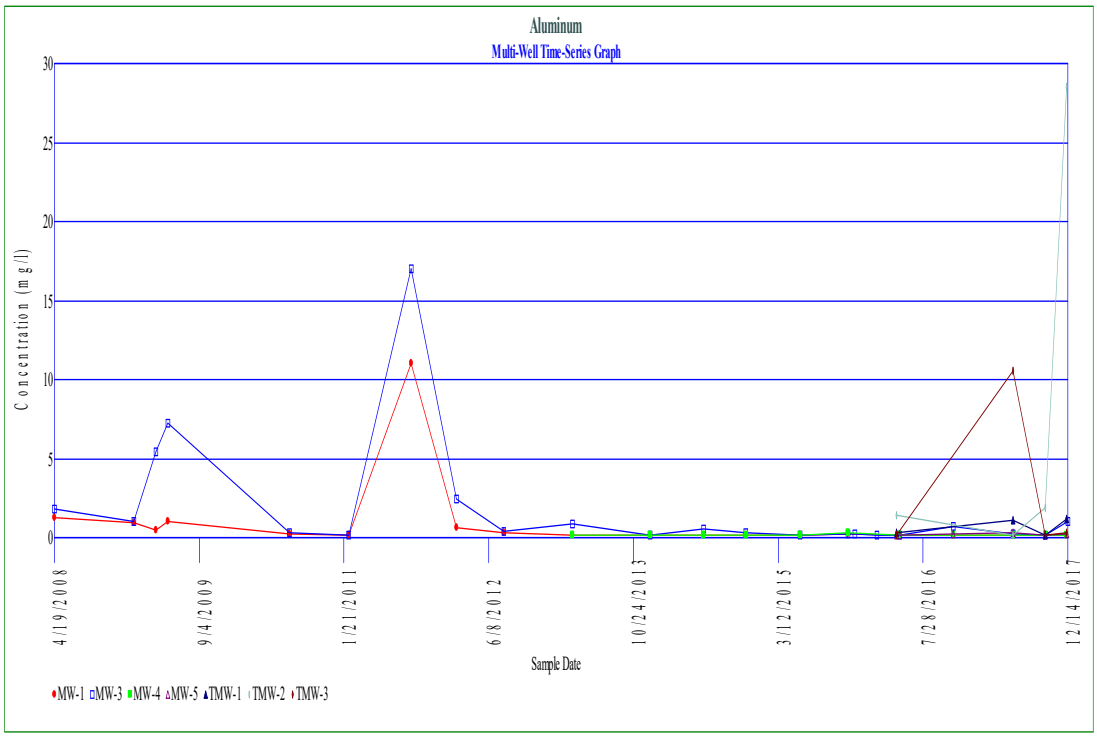
Notes:
* N/A due to low Power of Wilcoxin-Rank Sum non-parametric inter-well statistical procedure.

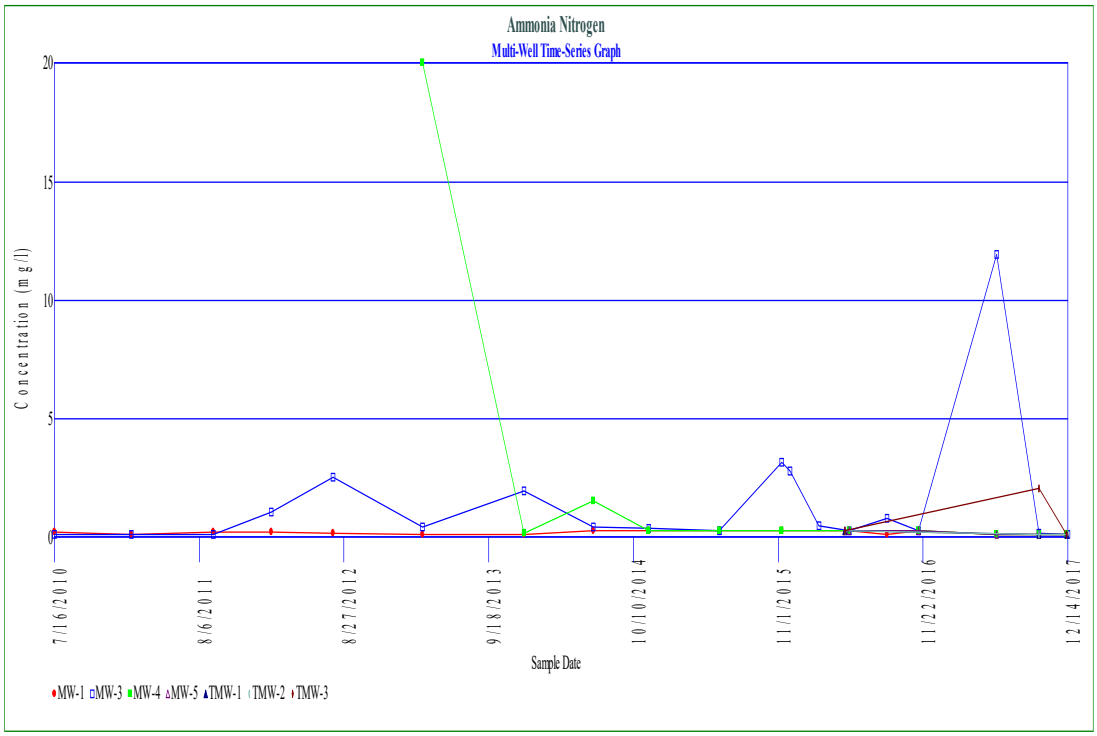
APPENDIX B
STATISTICAL EVALUATIONS & TIME SERIES PLOTS

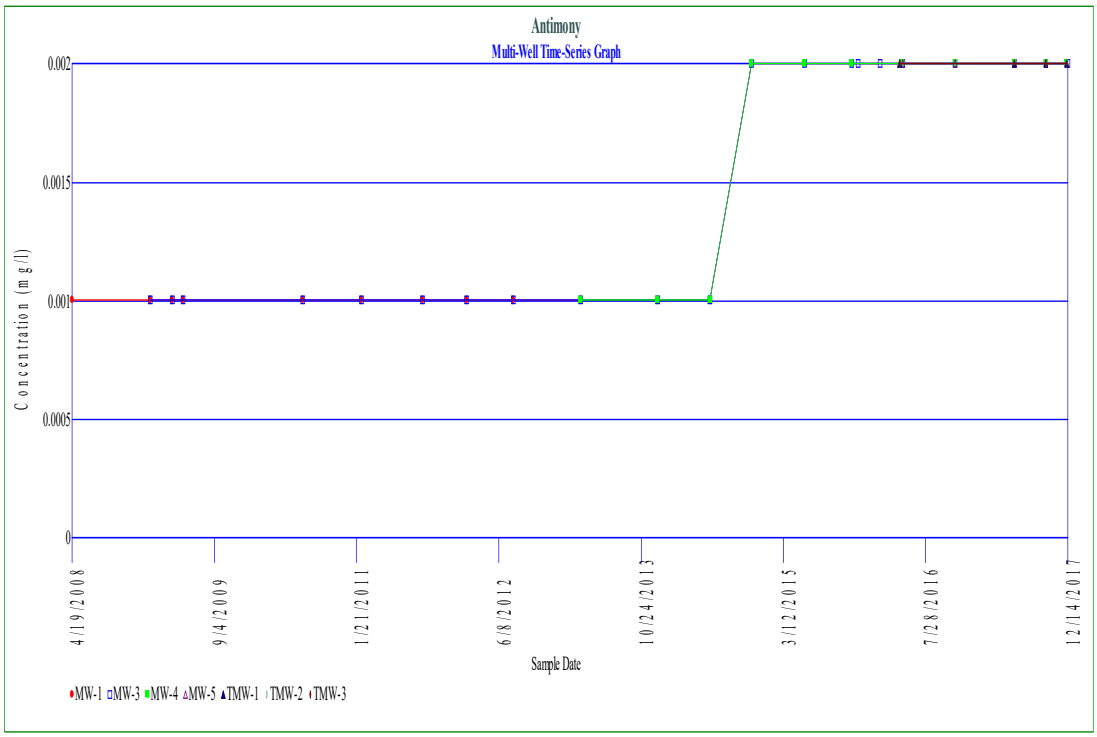

Total Cadmium
Multi-Well Time-Series Graph
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

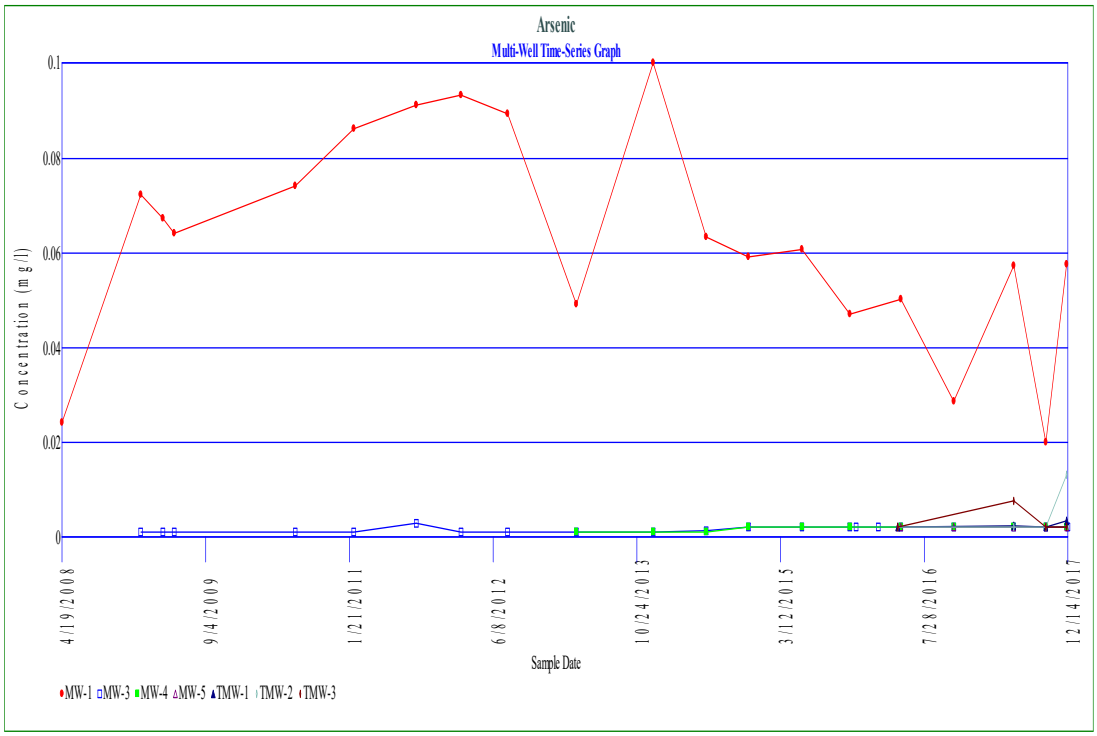

Chloride
Multi-Well Time-Series Graph
500
400
300
200
100
0
Concentration (mg/l)
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

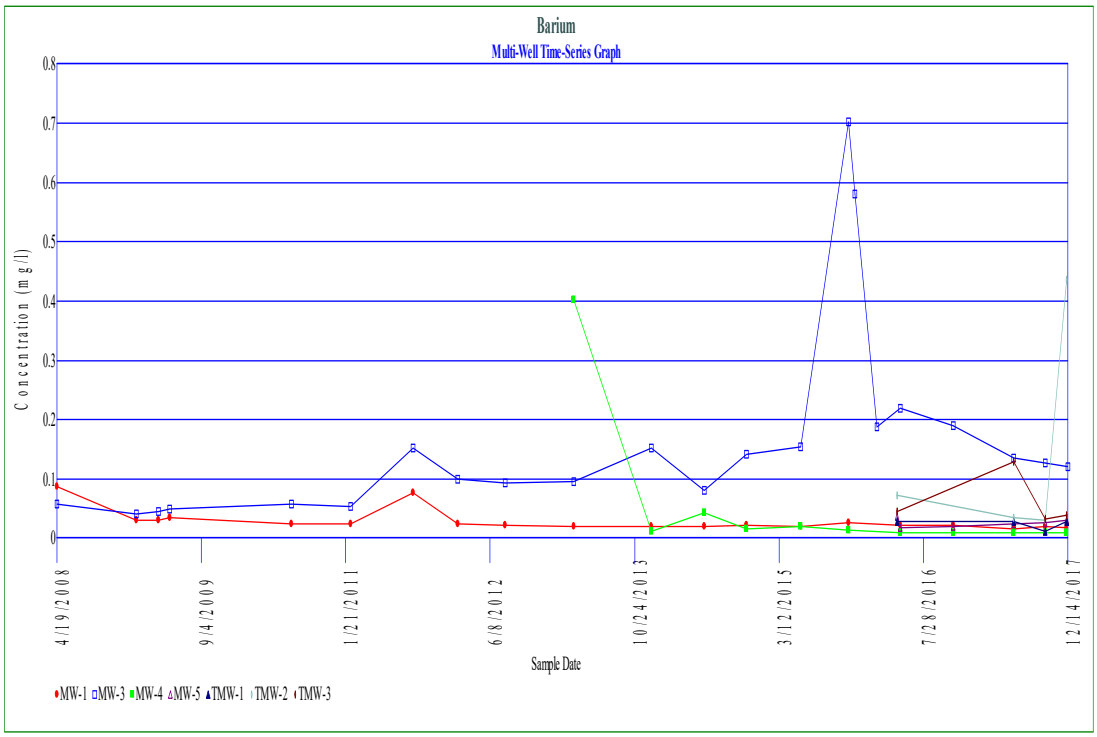

Alkalinity
Multi-Well Time-Series Graph
Concentration (mg/l)
80
70
60
50
40
30
20
10
0
2/19/2016
5/23/2016
8/26/2016
11/29/2016
3/4/2017
6/7/2017
9/10/2017
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

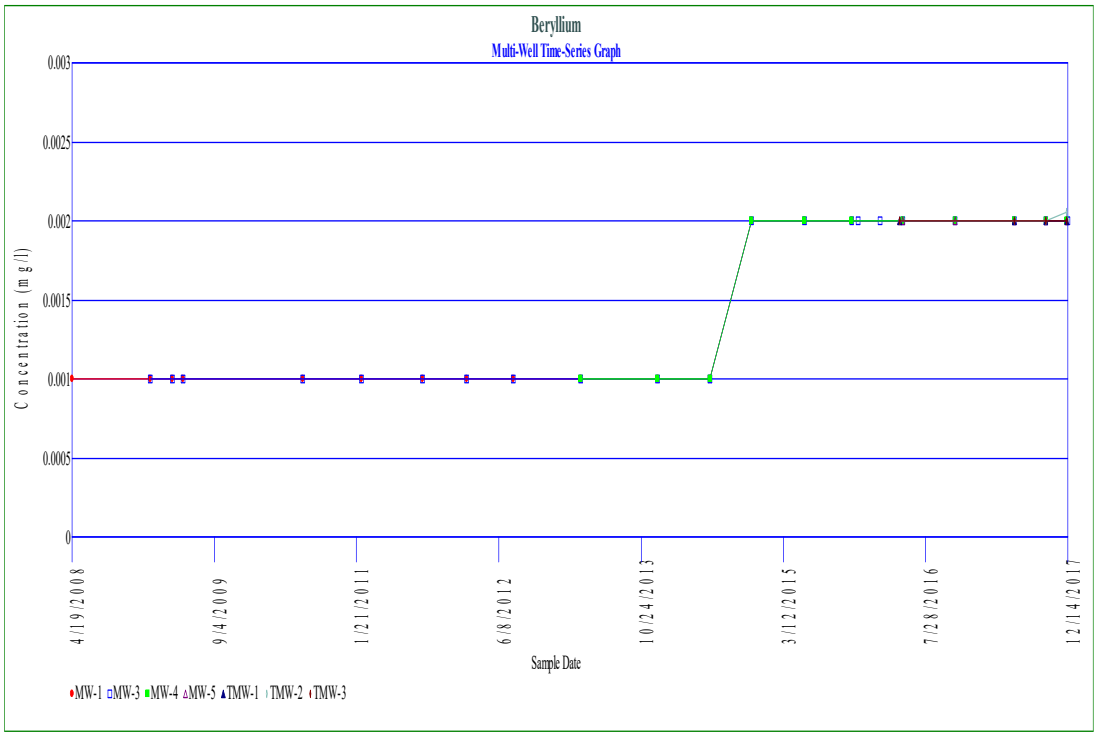

Aluminum
Multi-Well Time-Series Graph
Concentration (mg/l)
30
25
20
15
10
5
0
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

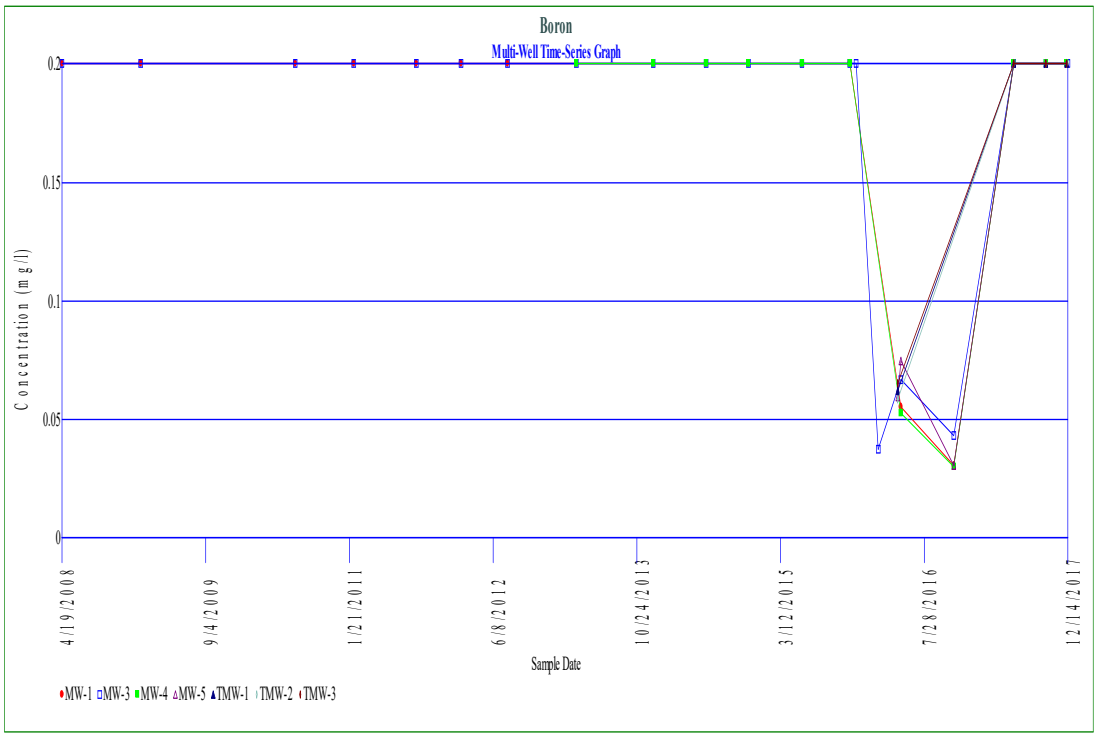

Ammonia Nitrogen
Multi-Well Time-Series Graph
Concentration (mg/l)
20
15
10
5
0
7/16/2010
8/6/2011
8/27/2012
9/18/2013
10/10/2014
11/1/2015
11/22/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

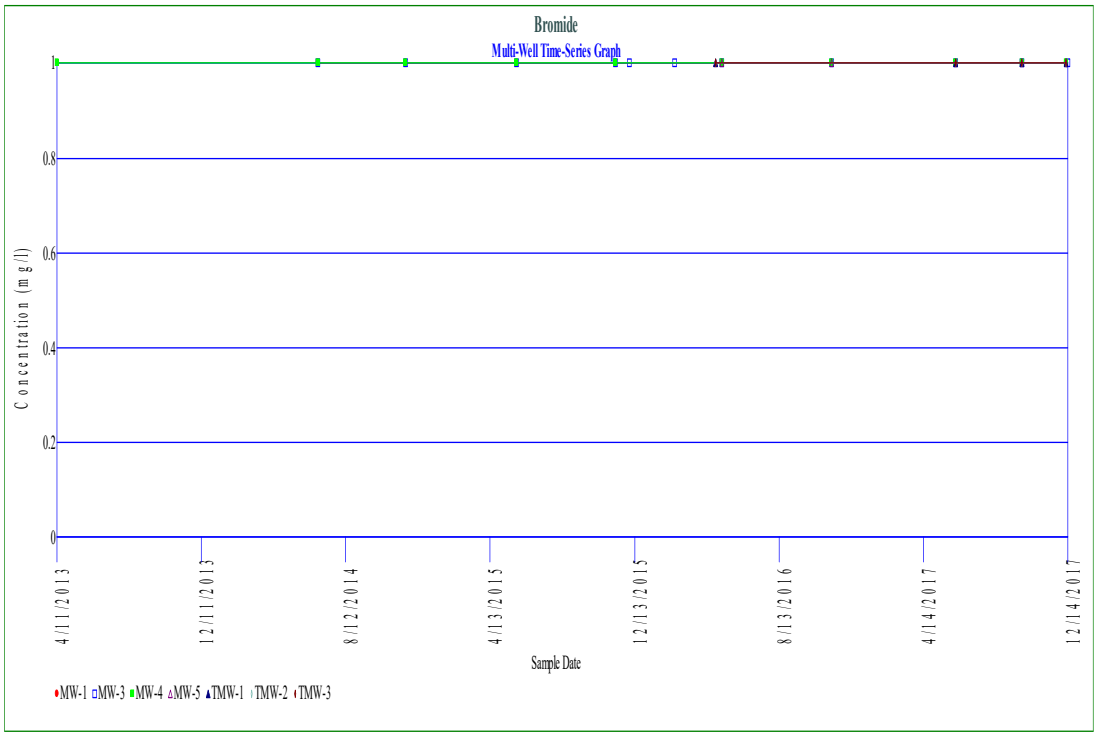

Antimony
Multi-Well Time-Series Graph
Concentration (mg/l)
0.002
0.0015
0.001
0.0005
0
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

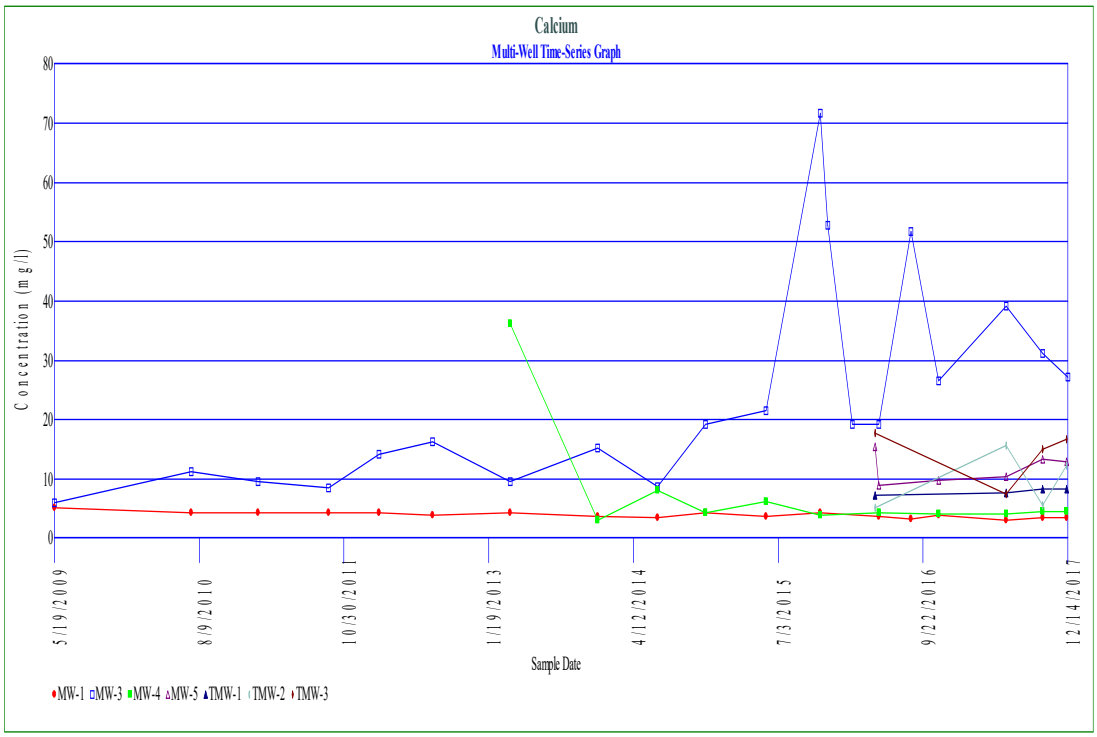

Arsenic
Multi-Well Time-Series Graph
0.1
0.08
0.06
0.04
0.02
0
Concentration (mg/l)
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

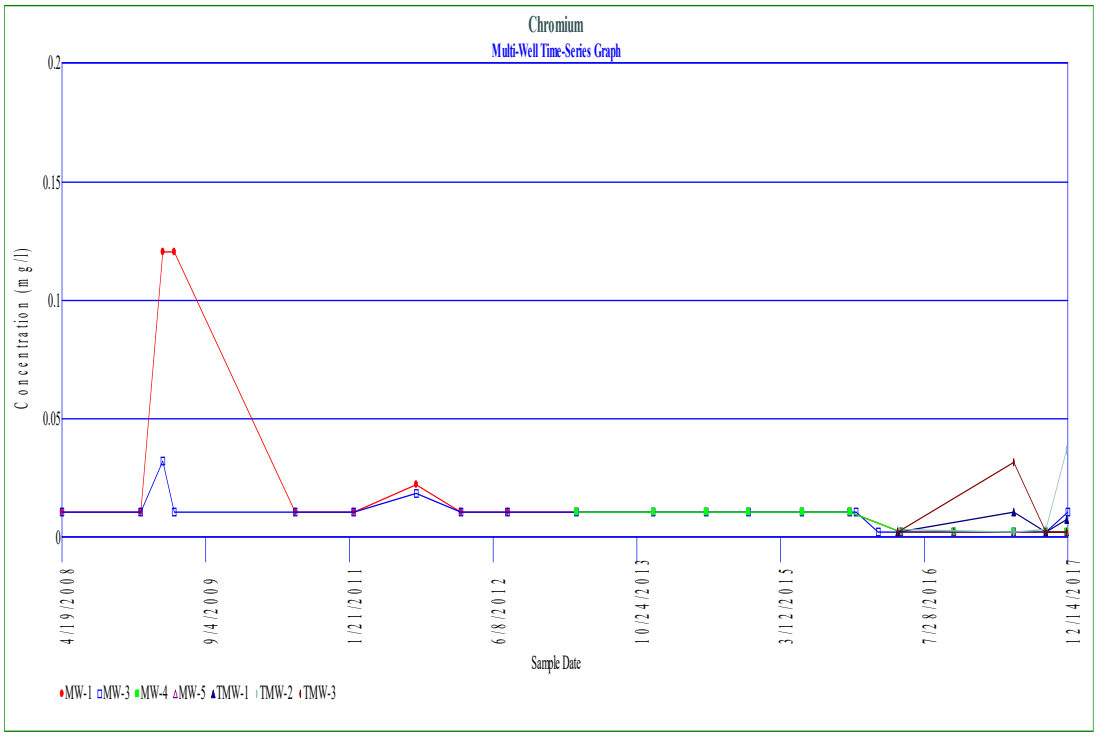

Barium
Multi-Well Time-Series Graph
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Concentration (mg/l)
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

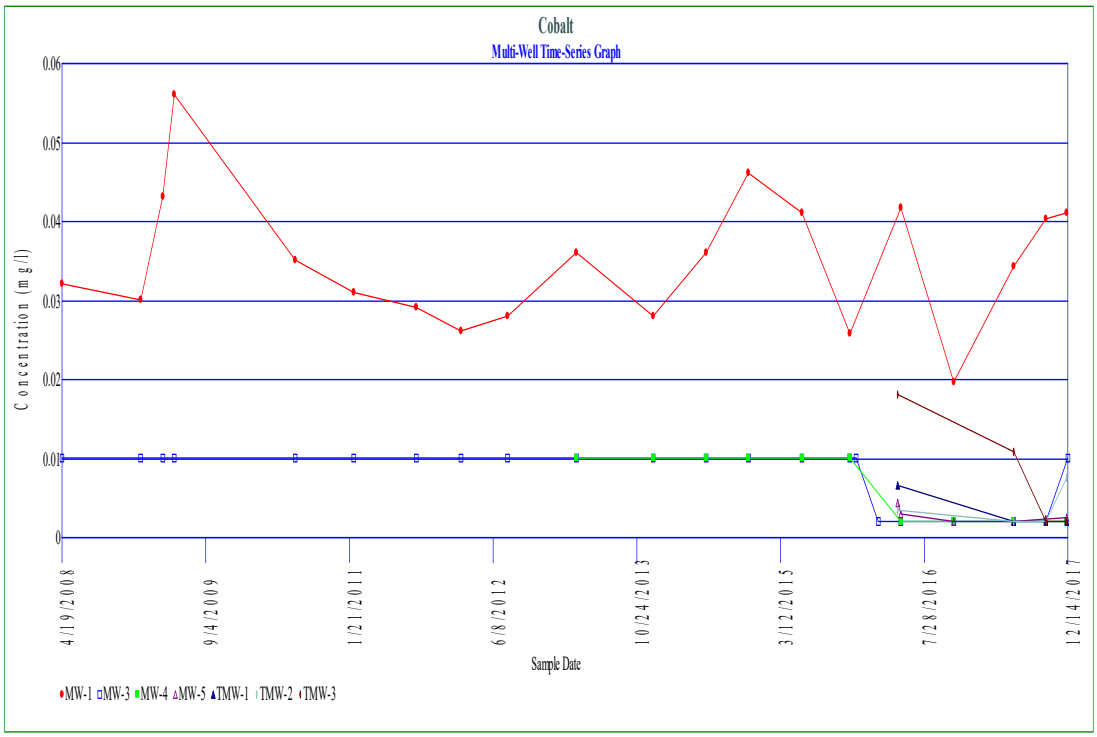

Beryllium
Multi-Well Time-Series Graph
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
Concentration (mg/l)
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

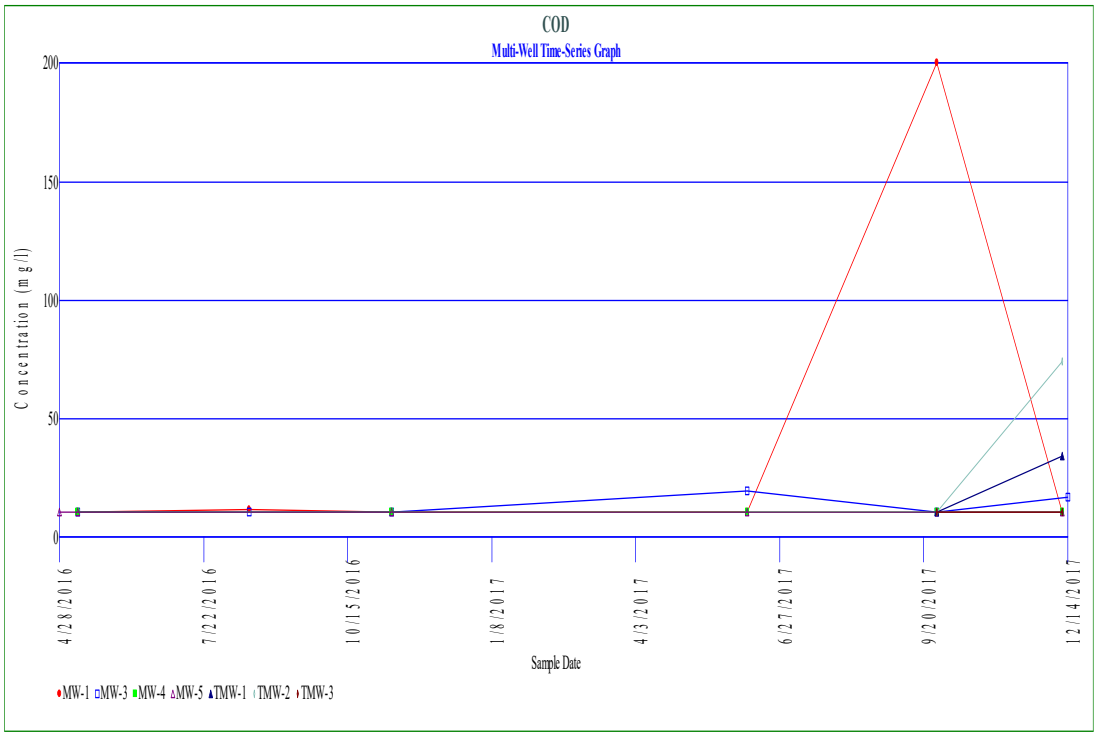

Boron
Multi-Well Time-Series Graph
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

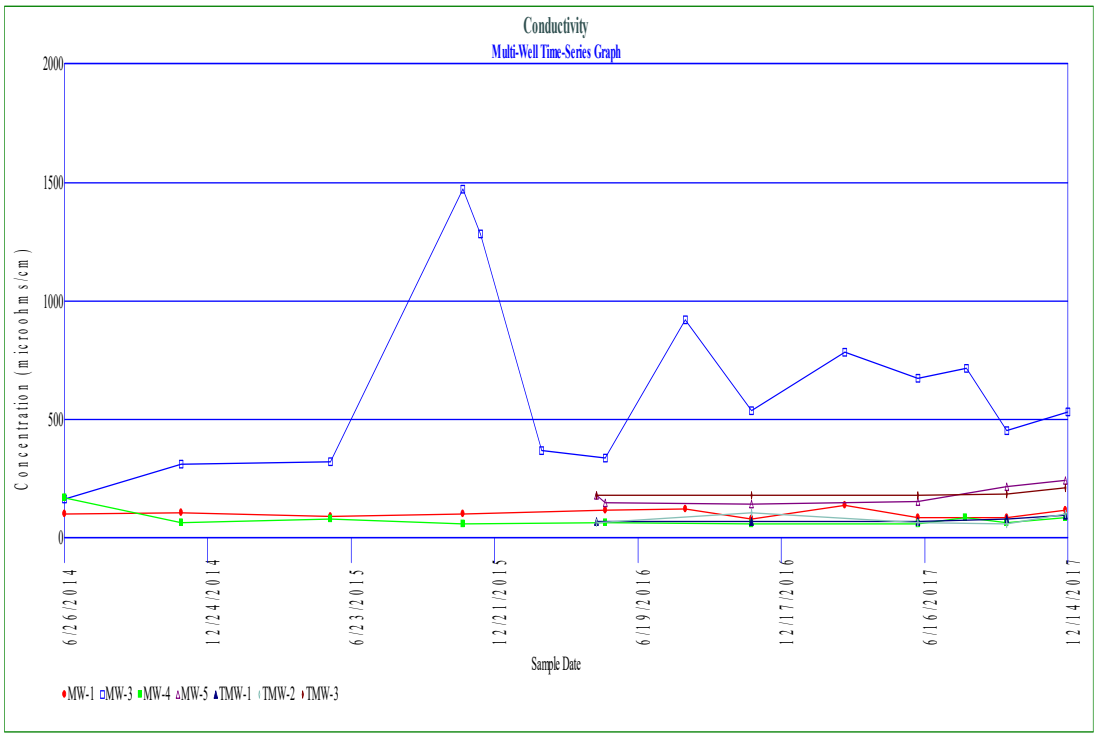

Bromide
Multi-Well Time-Series Graph
Concentration (mg/l)
1
0.8
0.6
0.4
0.2
0
4/11/2013
12/11/2013
8/12/2014
4/13/2015
12/13/2015
8/13/2016
4/14/2017
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

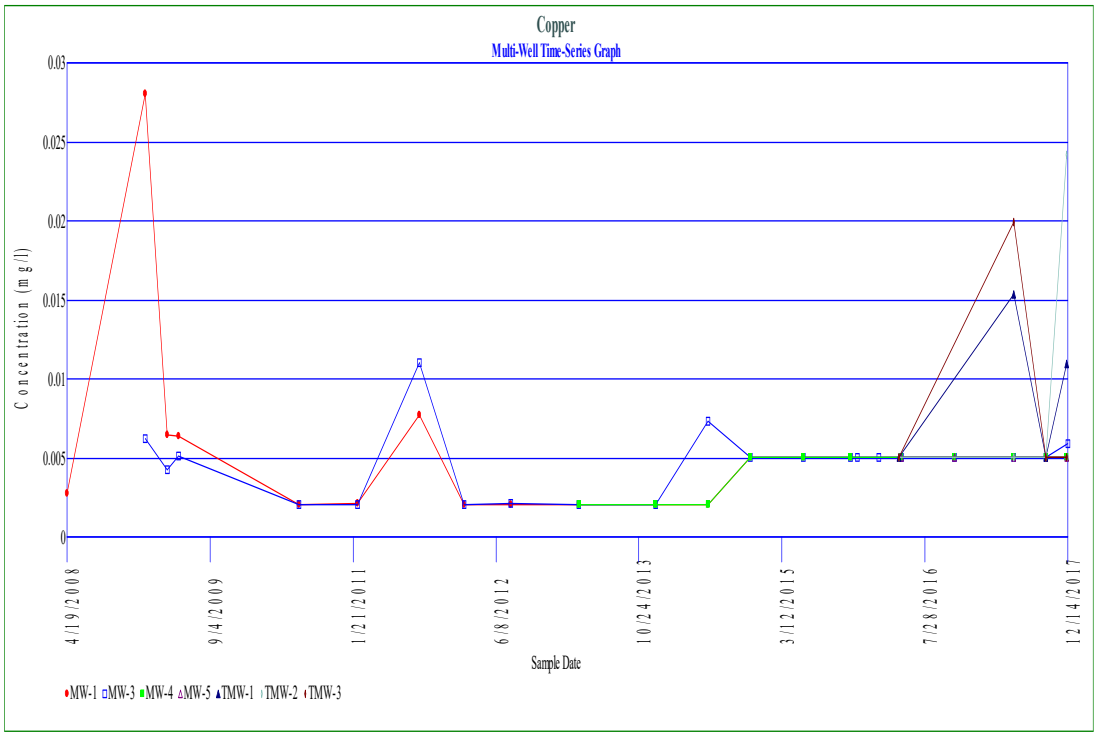

Calcium
Multi-Well Time-Series Graph
Concentration (mg/l)
80
70
60
50
40
30
20
10
0
5/19/2009
8/9/2010
10/30/2011
1/19/2013
4/12/2014
7/3/2015
9/22/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

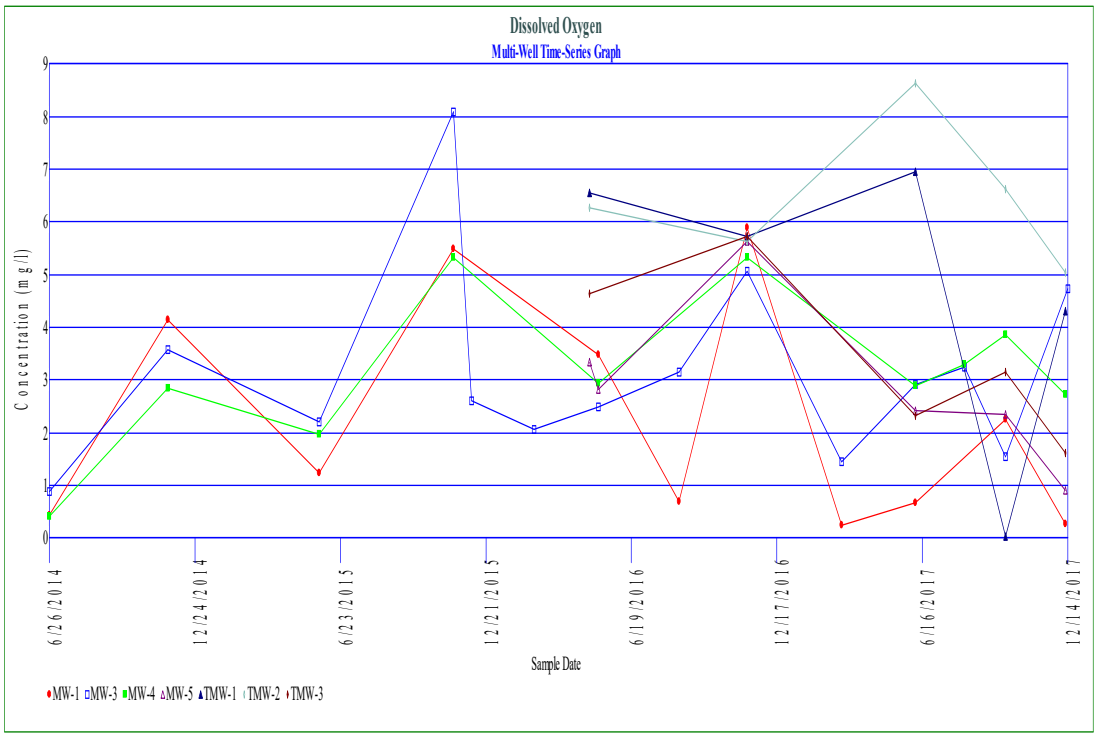

Chromium
Multi-Well Time-Series Graph
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

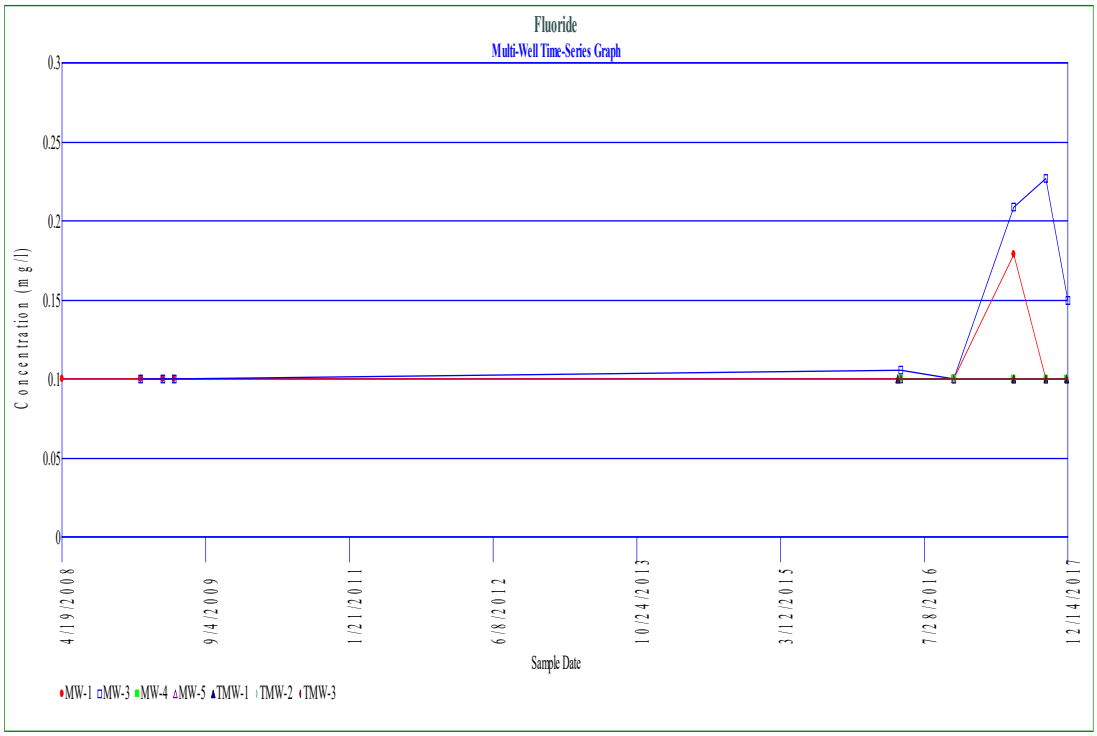

Cobalt
Multi-Well Time-Series Graph
0.06
0.05
0.04
0.03
0.02
0.01
0
Concentration (mg/l)
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

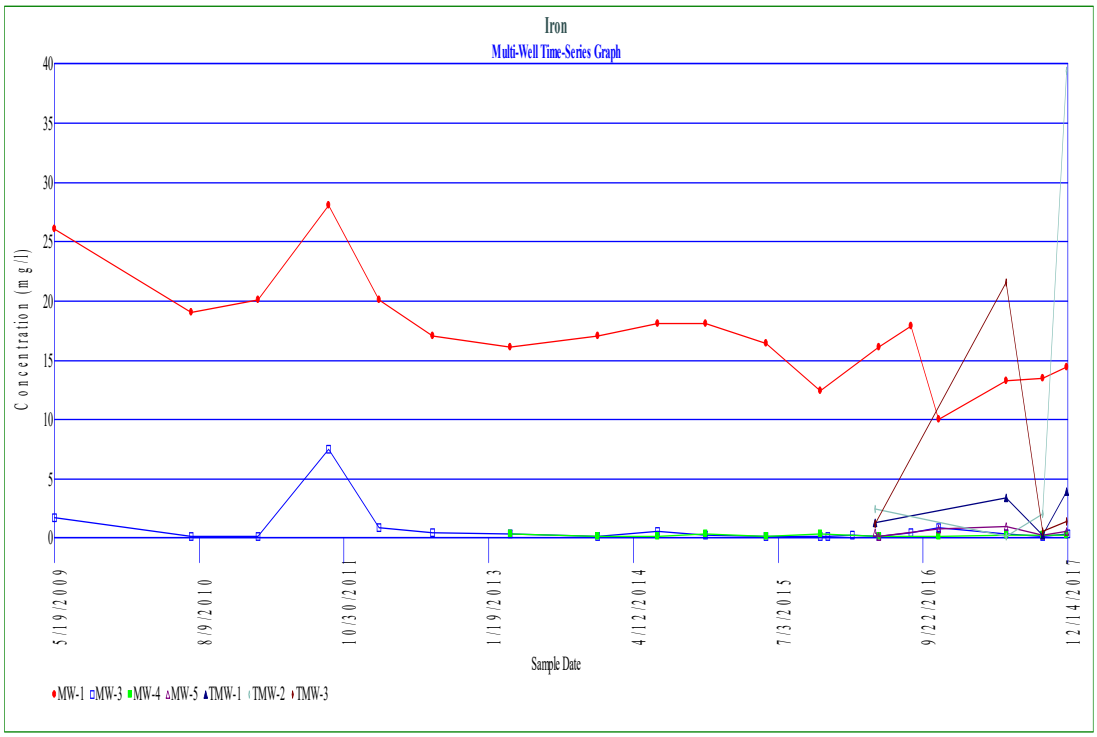

COD
Multi-Well Time-Series Graph
200
150
100
50
0
Concentration (mg/l)
4/28/2016
7/22/2016
10/15/2016
1/8/2017
4/3/2017
6/27/2017
9/20/2017
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

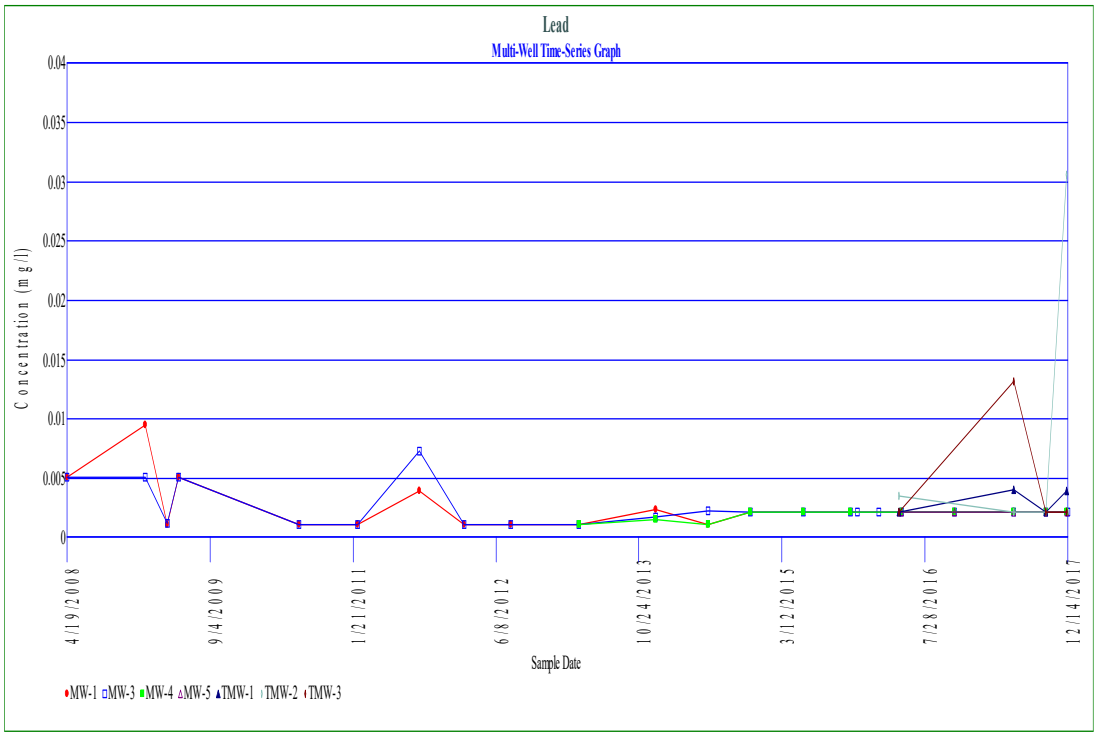

Conductivity
Multi-Well Time-Series Graph
2000
1500
1000
500
0
Concentration (microohms/cm)
6/26/2014
12/24/2014
6/23/2015
12/21/2015
6/19/2016
12/17/2016
6/16/2017
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

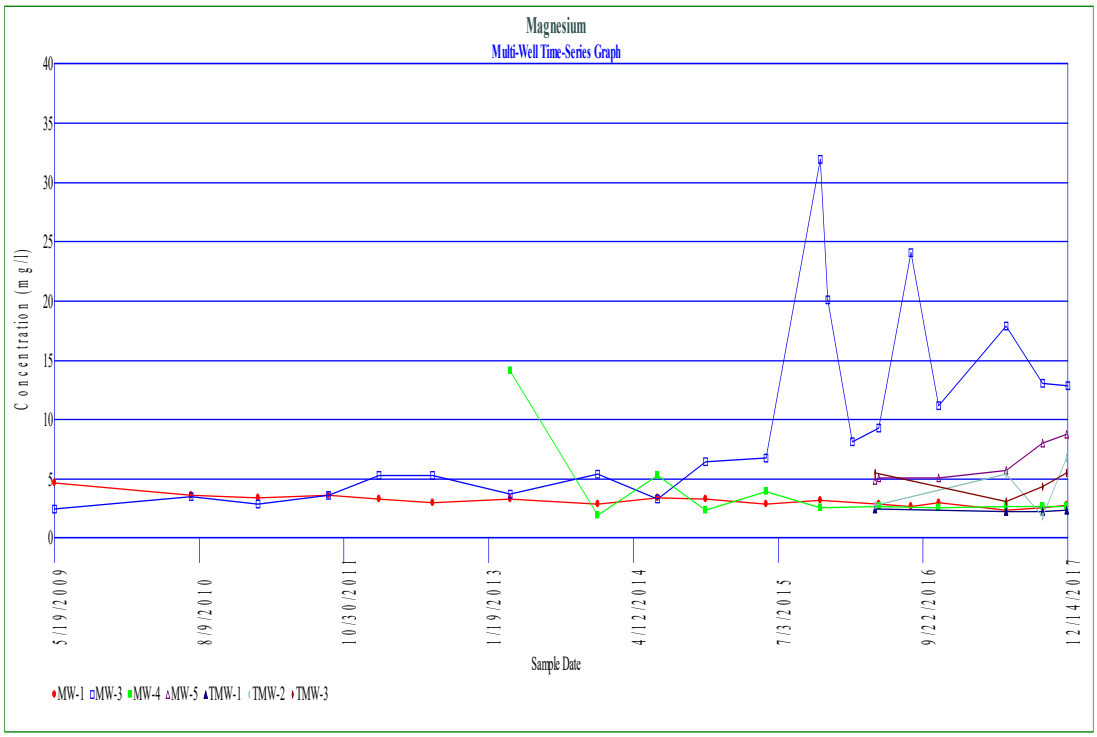

Copper
Multi-Well Time-Series Graph
Concentration (mg/l)
0.03
0.025
0.02
0.015
0.01
0.005
0
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

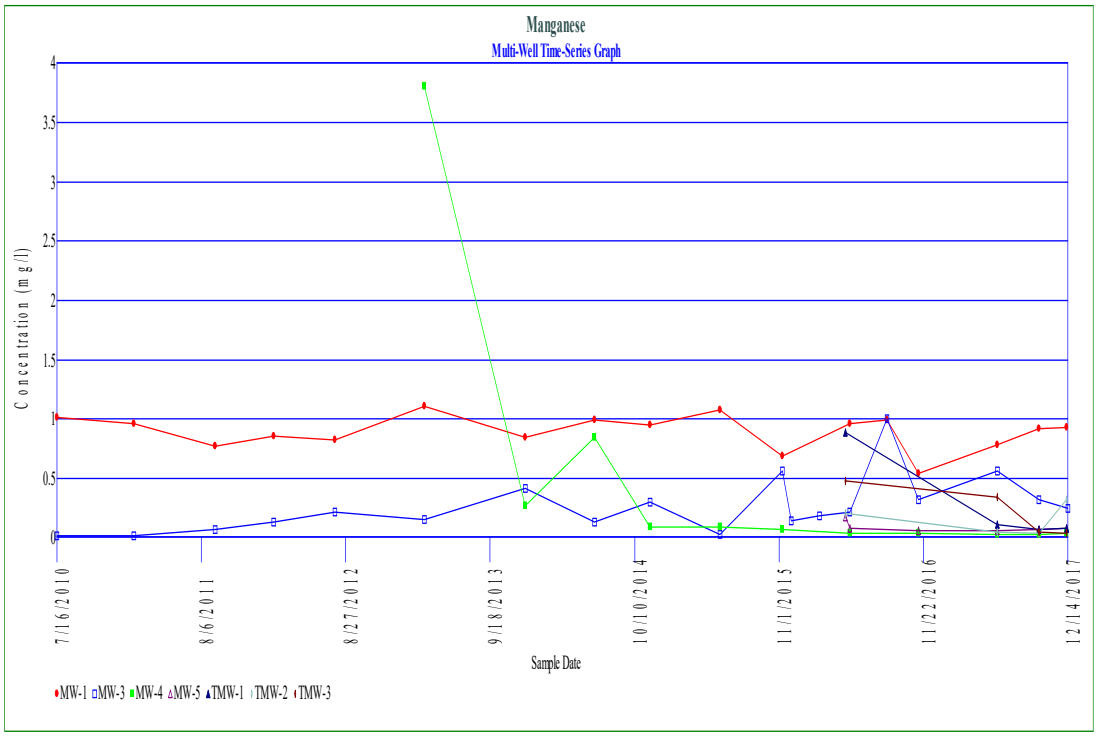

Dissolved Oxygen
Multi-Well Time-Series Graph
Concentration (mg/l)
9
8
7
6
5
4
3
2
1
0
6/26/2014
12/24/2014
6/23/2015
12/21/2015
6/19/2016
12/17/2016
6/16/2017
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

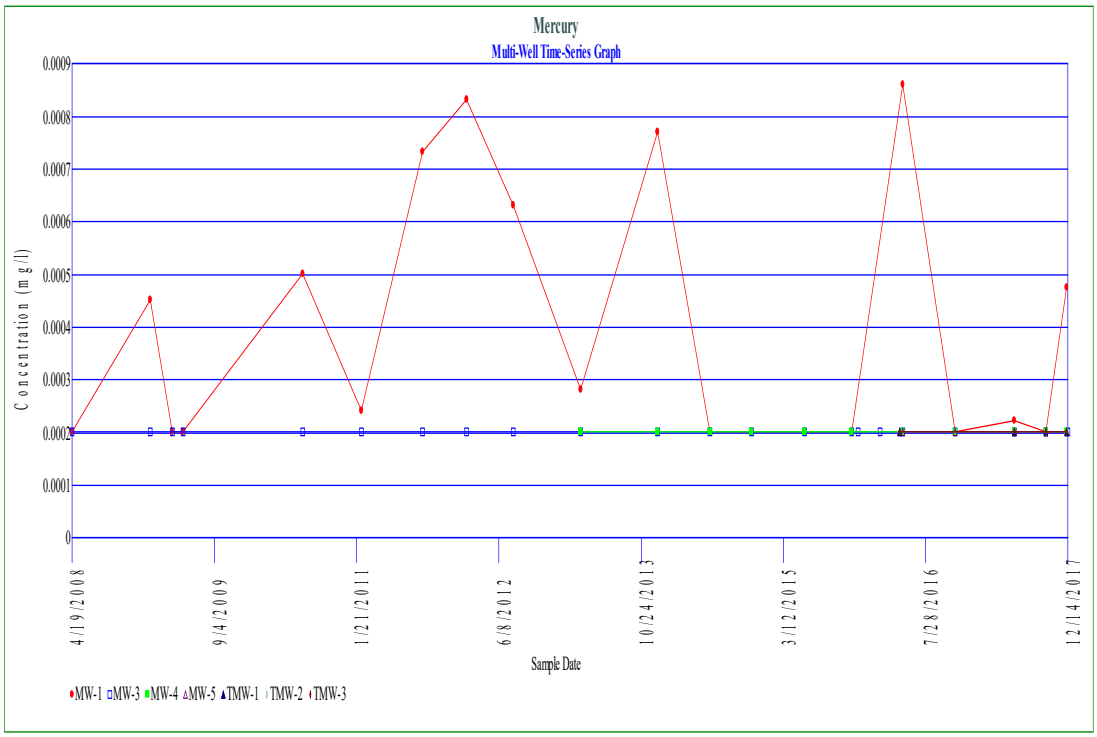

Fluoride
Multi-Well Time-Series Graph
Concentration (mg/l)
0.3
0.25
0.2
0.15
0.1
0.05
0
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

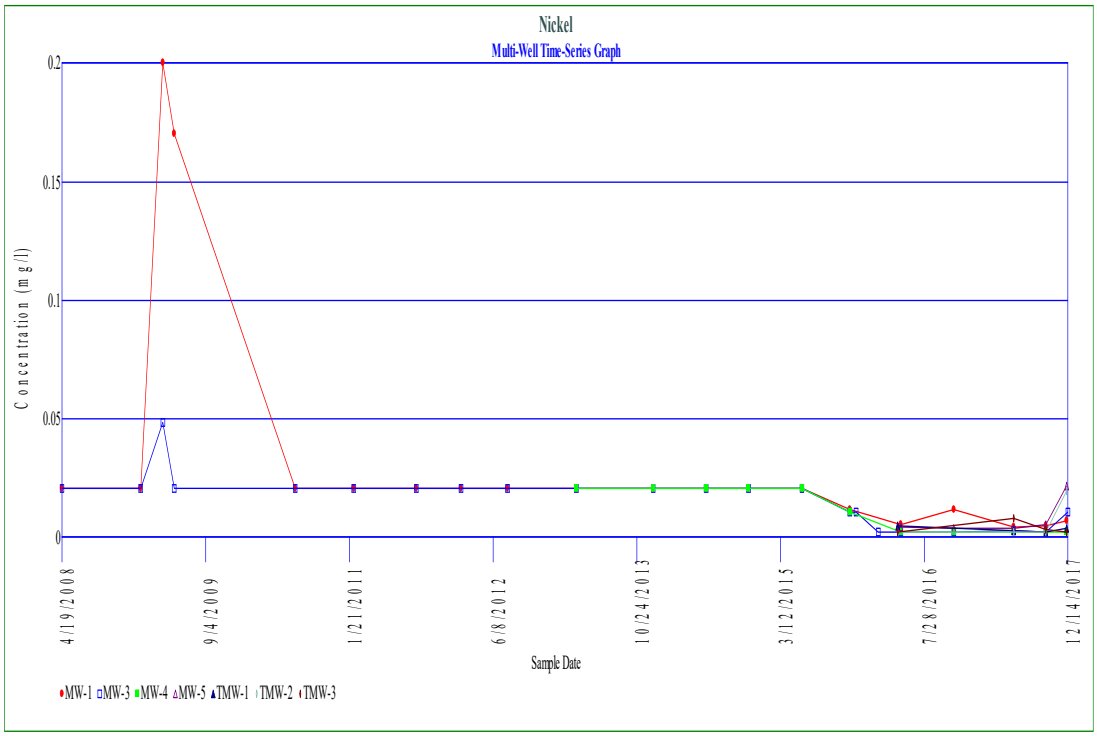

Iron
Multi-Well Time-Series Graph
Concentration (mg/l)
40
35
30
25
20
15
10
5
0
5/19/2009
8/9/2010
10/30/2011
1/19/2013
4/12/2014
7/3/2015
9/22/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

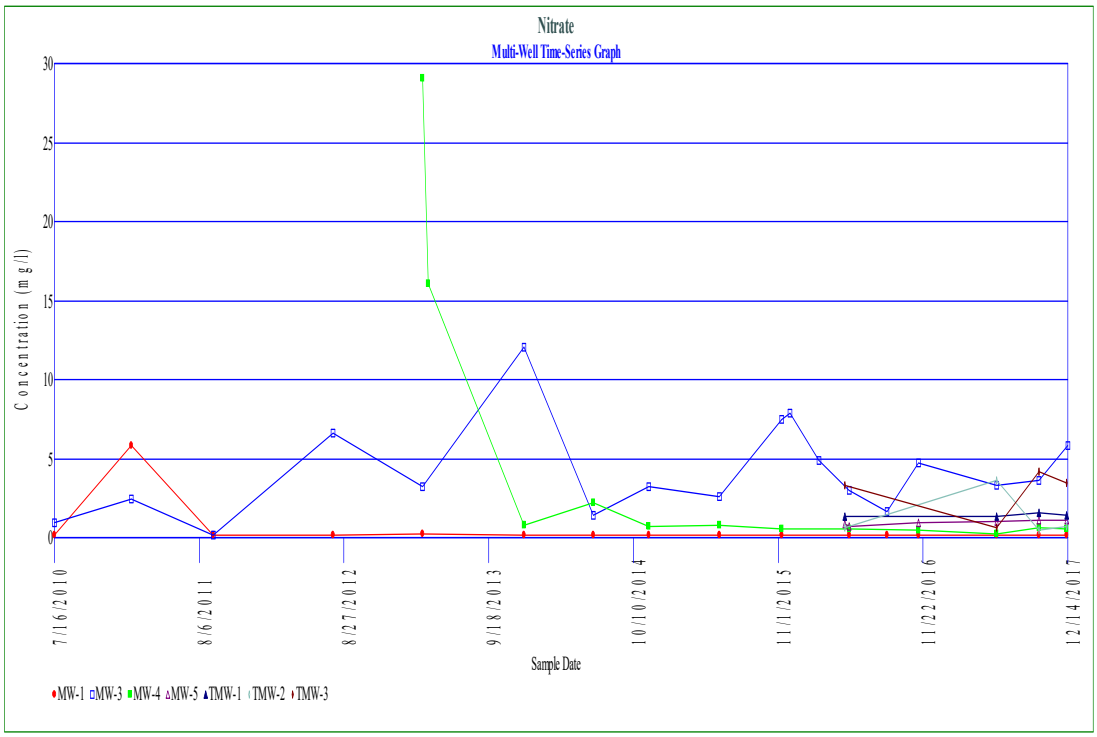

Lead
Multi-Well Time-Series Graph
Concentration (mg/l)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Magnesium
Multi-Well Time-Series Graph
Concentration (mg/l)
40
35
30
25
20
15
10
5
0
5/19/2009
8/9/2010
10/30/2011
1/19/2013
4/12/2014
7/3/2015
9/22/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

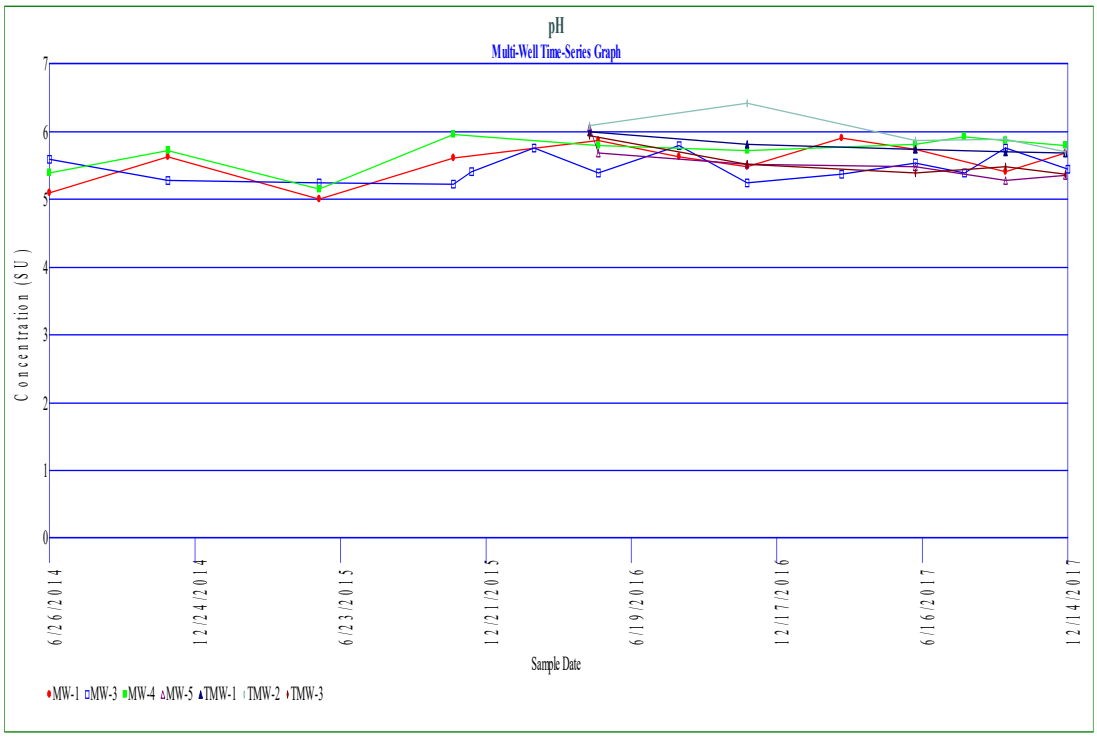

Manganese
Multi-Well Time-Series Graph
Concentration (mg/l)
4
3.5
3
2.5
2
1.5
1
0.5
0
7/16/2010
8/6/2011
8/27/2012
9/18/2013
10/10/2014
11/1/2015
11/22/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

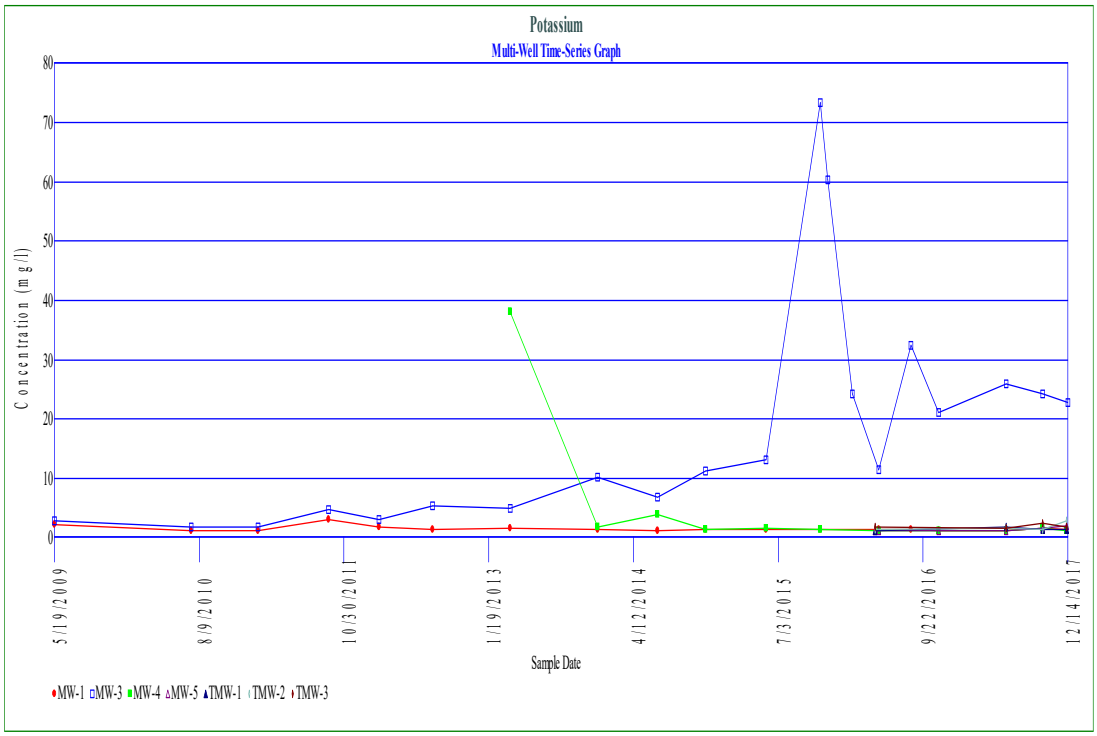

Mercury
Multi-Well Time-Series Graph
Concentration (mg/l)
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

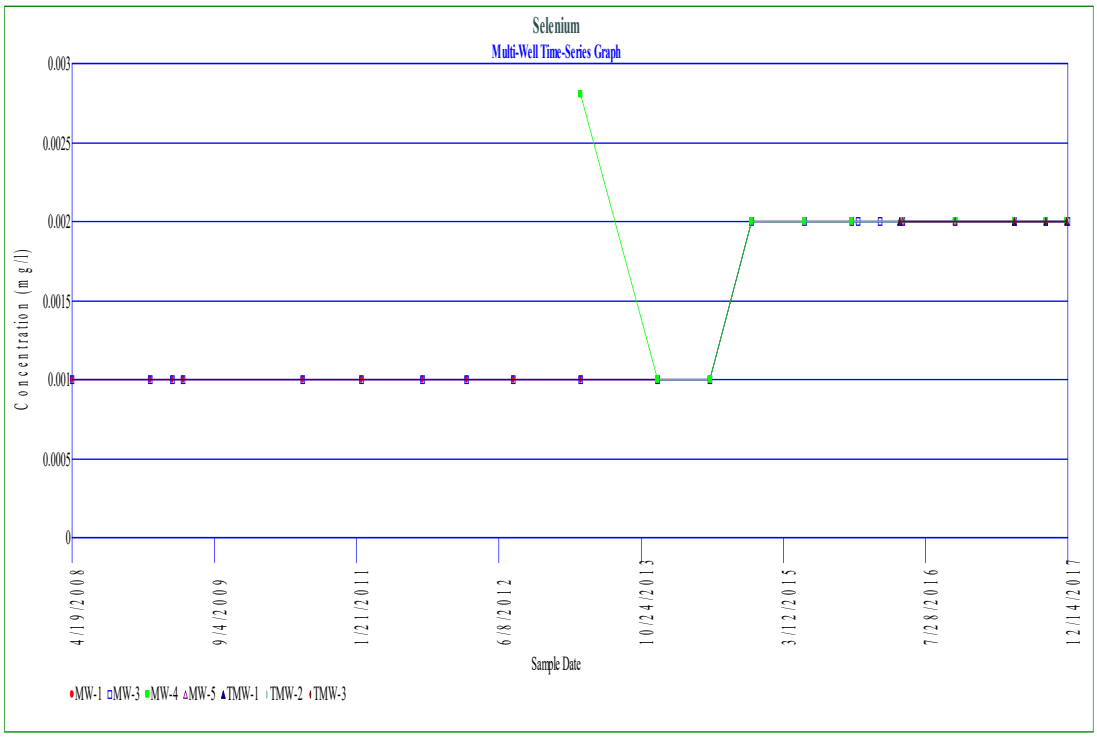

Nickel
Multi-Well Time-Series Graph
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

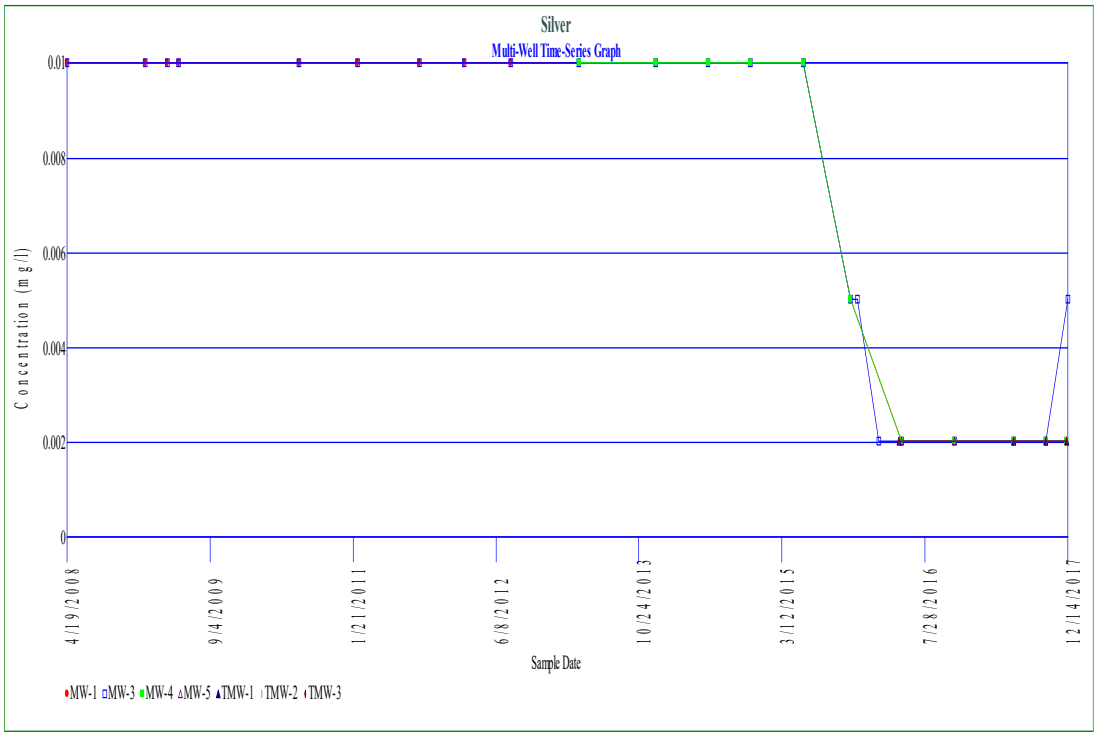

Nitrate
Multi-Well Time-Series Graph
30
25
20
15
10
5
0
Concentration (mg/l)
7/16/2010
8/6/2011
8/27/2012
9/18/2013
10/10/2014
11/1/2015
11/22/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

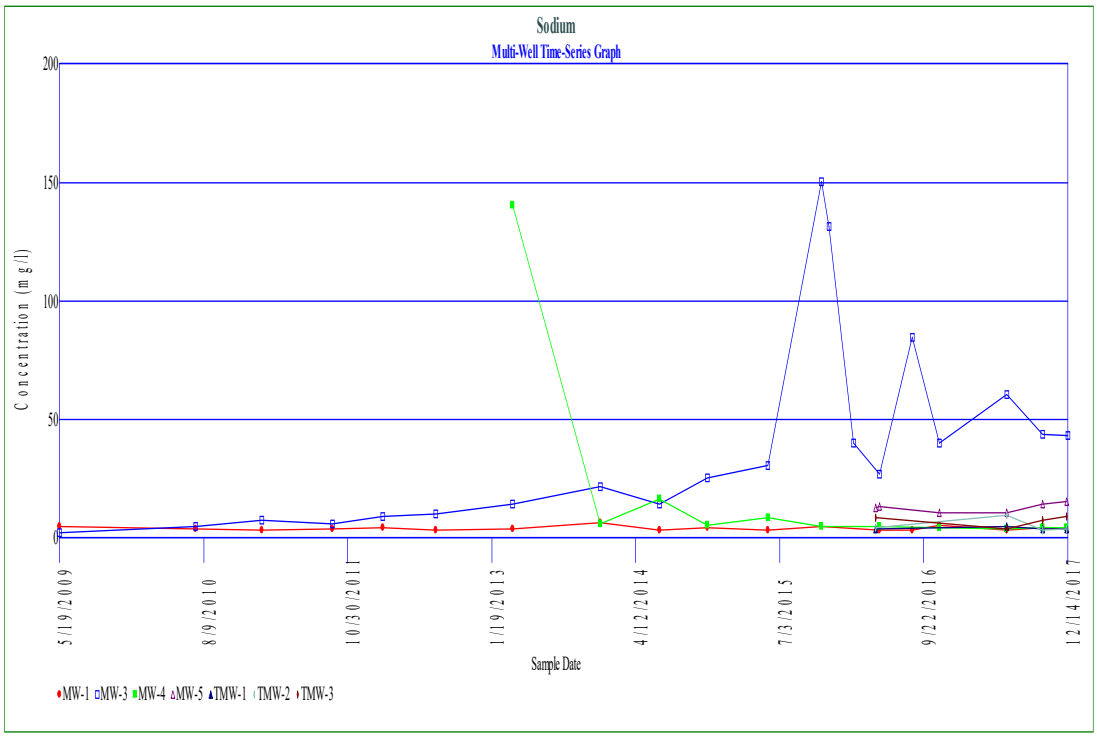

ORP
Multi-Well Time-Series Graph
Concentration (mV)
300
250
200
150
100
50
0
6/26/2014
12/24/2014
6/23/2015
12/21/2015
6/19/2016
12/17/2016
6/16/2017
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

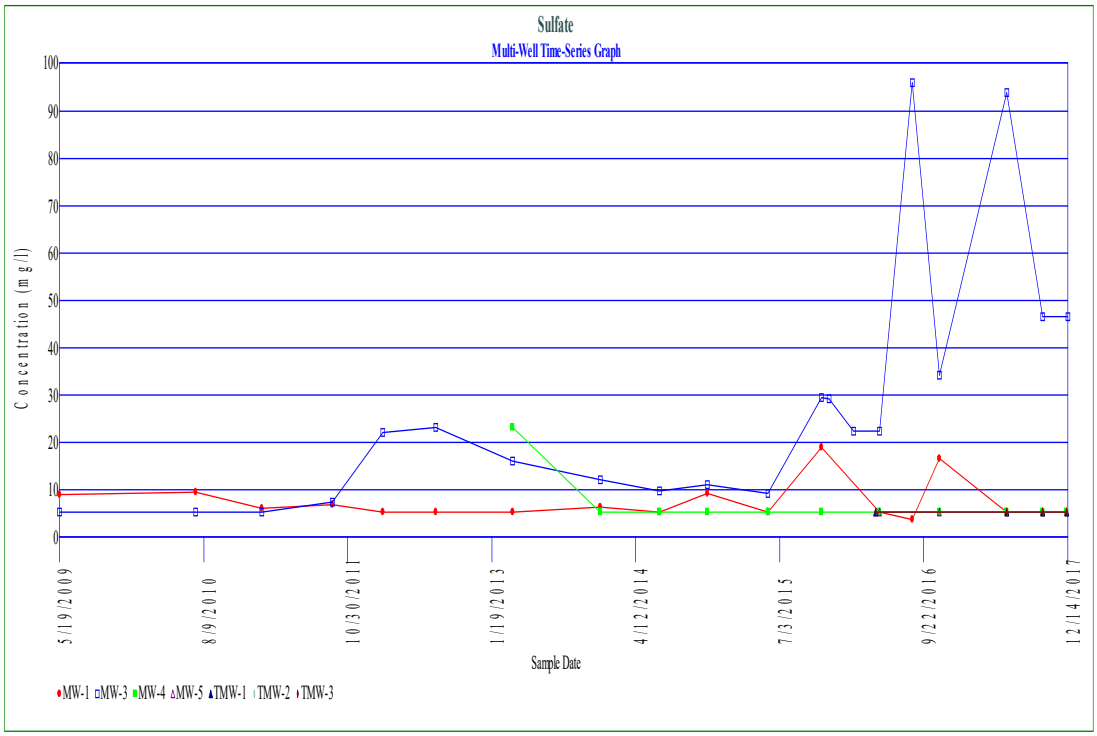

pH
Multi-Well Time-Series Graph
Concentration (SU)
7
6
5
4
3
2
1
0
6/26/2014
12/24/2014
6/23/2015
12/21/2015
6/19/2016
12/17/2016
6/16/2017
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Potassium
Multi-Well Time-Series Graph
Concentration (mg/l)
80
70
60
50
40
30
20
10
0
5/19/2009
8/9/2010
10/30/2011
1/19/2013
4/12/2014
7/3/2015
9/22/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

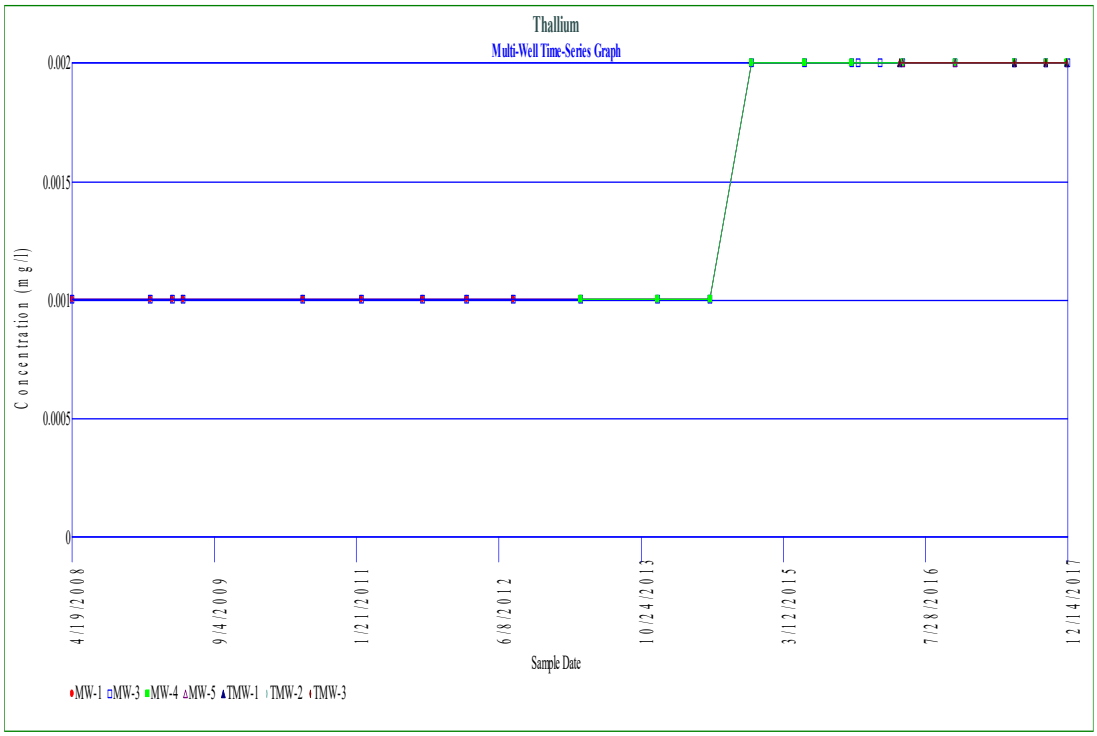

Selenium
Multi-Well Time-Series Graph
Concentration (mg/l)
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

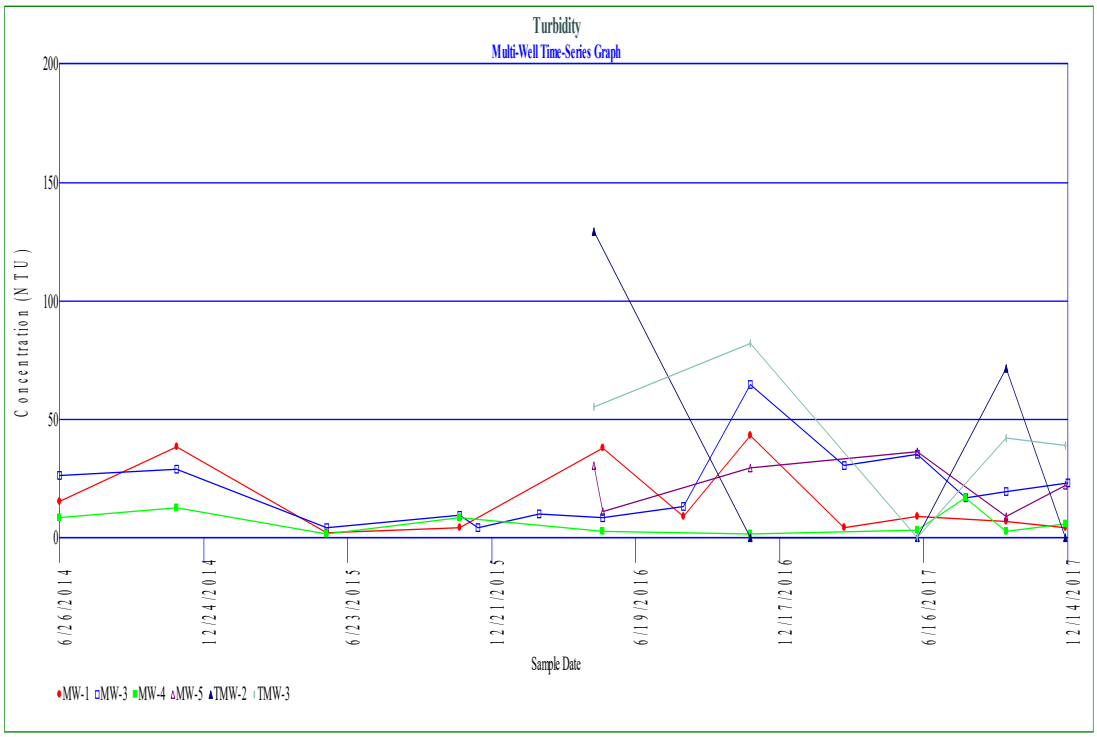

Silver
Multi-Well Time-Series Graph
0.01
0.008
0.006
0.004
0.002
0
Concentration (mg/l)
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

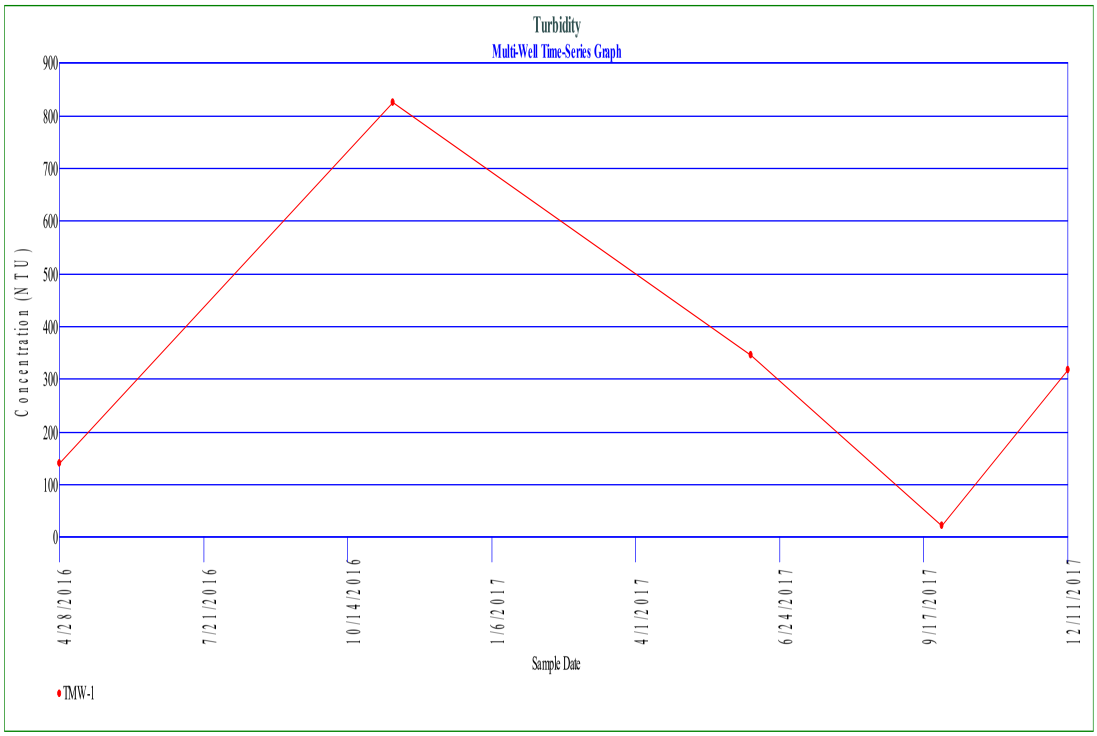

Sodium
Multi-Well Time-Series Graph
200
150
100
50
0
Concentration (mg/l)
5/19/2009
8/9/2010
10/30/2011
1/19/2013
4/12/2014
7/3/2015
9/22/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Sulfate
Multi-Well Time-Series Graph
Concentration (mg/l)
100
90
80
70
60
50
40
30
20
10
0
5/19/2009
8/9/2010
10/30/2011
1/19/2013
4/12/2014
7/3/2015
9/22/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

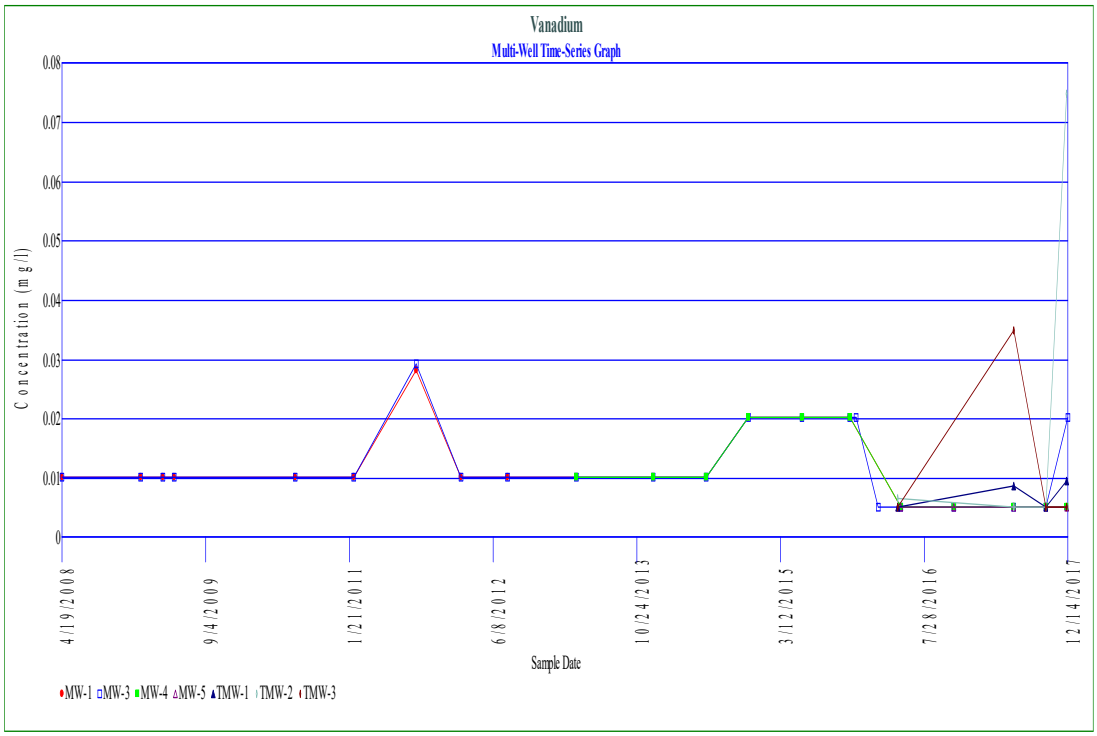

Temperature
Multi-Well Time-Series Graph
Concentration (°C)
30
25
20
15
10
5
0
6/26/2014
12/24/2014
6/23/2015
12/21/2015
6/19/2016
12/17/2016
6/16/2017
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

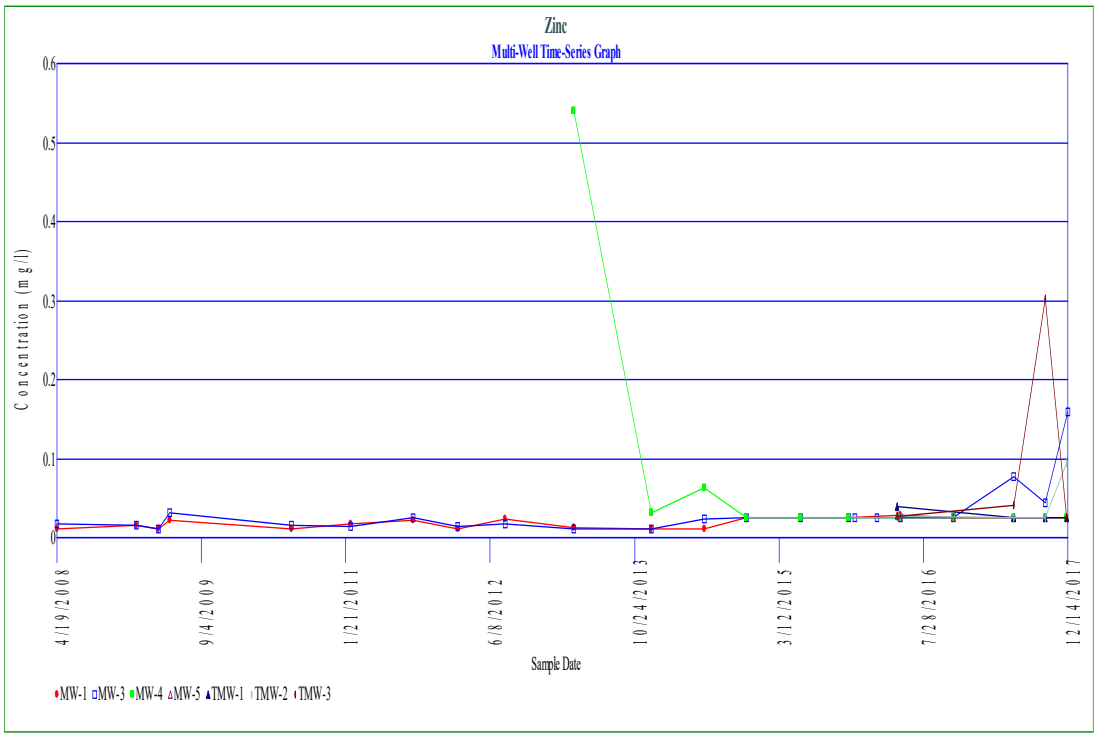

Thallium
Multi-Well Time-Series Graph
0.002
0.0015
0.001
0.0005
0
Concentration (mg/l)
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Turbidity
Multi-Well Time-Series Graph
200
150
100
50
0
Concentration (NTU)
6/26/2014
12/24/2014
6/23/2015
12/21/2015
6/19/2016
12/17/2016
6/16/2017
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-2 TMW-3


Turbidity
Multi-Well Time-Series Graph
900
800
700
600
500
400
300
200
100
0
Concentration (NTU)
4/28/2016
7/21/2016
10/14/2016
1/6/2017
4/1/2017
6/24/2017
9/17/2017
12/11/2017
Sample Date
TMW-1


Turbidity
Multi-Well Time-Series Graph
70
60
50
40
30
20
10
0
Concentration (NTU)
6/26/2014
12/24/2014
6/23/2015
12/21/2015
6/19/2016
12/17/2016
6/16/2017
12/14/2017
Sample Date
MW-3


Vanadium
Multi-Well Time-Series Graph
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Concentration (mg/l)
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Zinc
Multi-Well Time-Series Graph
0.6
0.5
0.4
0.3
0.2
0.1
0
Concentration (mg/l)
4/19/2008
9/4/2009
1/21/2011
6/8/2012
10/24/2013
3/12/2015
7/28/2016
12/14/2017
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

Shapiro-Francia Test of Normality

Parameter: Aluminum
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 59

Data Set Standard Deviation = 2.78186
Numerator = 7851.22
Denominator = 23566
W Statistic = 0.333158 = 7851.22 / 23566

5% Critical value of 0.962 exceeds 0.333158
Evidence of non-normality at 95% level of significance

1% Critical value of 0.945 exceeds 0.333158
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Barium
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 59

Data Set Standard Deviation = 0.127246
Numerator = 26.4948
Denominator = 49.3066
W Statistic = 0.537347 = 26.4948 / 49.3066

5% Critical value of 0.962 exceeds 0.537347
Evidence of non-normality at 95% level of significance

1% Critical value of 0.945 exceeds 0.537347
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Total Cadmium
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 57

Data Set Standard Deviation = 0.00405217
Numerator = 0.0100408
Denominator = 0.0465073
W Statistic = 0.215898 = 0.0100408 / 0.0465073

5% Critical value of 0.961 exceeds 0.215898
Evidence of non-normality at 95% level of significance

1% Critical value of 0.944 exceeds 0.215898
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Chloride
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 62

Data Set Standard Deviation = 86.2175
Numerator = 1.39628e+007
Denominator = 2.52133e+007
W Statistic = 0.553788 = 1.39628e+007 / 2.52133e+007

5% Critical value of 0.964 exceeds 0.553788
Evidence of non-normality at 95% level of significance

1% Critical value of 0.947 exceeds 0.553788
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Cobalt
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 59

Data Set Standard Deviation = 0.0146333
Numerator = 0.545673
Denominator = 0.652079
W Statistic = 0.83682 = 0.545673 / 0.652079

5% Critical value of 0.962 exceeds 0.83682
Evidence of non-normality at 95% level of significance

1% Critical value of 0.945 exceeds 0.83682
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Fluoride
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 14 for 28 measurements

Sum of b values = 0.117904
Sample Standard Deviation = 0.0340293
W Statistic = 0.444615

5% Critical value of 0.924 exceeds 0.444615
Evidence of non-normality at 95% level of significance

1% Critical value of 0.896 exceeds 0.444615
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Nickel
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 59

Data Set Standard Deviation = 0.0326022
Numerator = 1.163
Denominator = 3.23675
W Statistic = 0.35931 = 1.163 / 3.23675

5% Critical value of 0.962 exceeds 0.35931
Evidence of non-normality at 95% level of significance

1% Critical value of 0.945 exceeds 0.35931
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Sulfate
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 55

Data Set Standard Deviation = 18.8011
Numerator = 493215
Denominator = 929874
W Statistic = 0.530411 = 493215 / 929874

5% Critical value of 0.958 exceeds 0.530411
Evidence of non-normality at 95% level of significance

1% Critical value of 0.94 exceeds 0.530411
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Zinc
All Locations
Normality Test of Parameter Concentrations
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 59

Data Set Standard Deviation = 0.0701805
Numerator = 3.25977
Denominator = 14.9985
W Statistic = 0.217339 = 3.25977 / 14.9985

5% Critical value of 0.962 exceeds 0.217339
Evidence of non-normality at 95% level of significance

1% Critical value of 0.945 exceeds 0.217339
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Aluminum
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 59

Data Set Standard Deviation = 1.53177
Numerator = 6063.12
Denominator = 7145.04
W Statistic = 0.848577 = 6063.12 / 7145.04

5% Critical value of 0.962 exceeds 0.848577
Evidence of non-normality at 95% level of significance

1% Critical value of 0.945 exceeds 0.848577
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Barium
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 59

Data Set Standard Deviation = 1.12436
Numerator = 3659.82
Denominator = 3849.66
W Statistic = 0.950686 = 3659.82 / 3849.66

5% Critical value of 0.962 exceeds 0.950686
Evidence of non-normality at 95% level of significance

1% Critical value of 0.945 is less than 0.950686
Data is normally distributed at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Total Cadmium
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 57

Data Set Standard Deviation = 0.839443
Numerator = 605.813
Denominator = 1995.85
W Statistic = 0.303537 = 605.813 / 1995.85

5% Critical value of 0.961 exceeds 0.303537
Evidence of non-normality at 95% level of significance

1% Critical value of 0.944 exceeds 0.303537
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Chloride
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 62

Data Set Standard Deviation = 1.56824
Numerator = 7971.37
Denominator = 8341.84
W Statistic = 0.955589 = 7971.37 / 8341.84

5% Critical value of 0.964 exceeds 0.955589
Evidence of non-normality at 95% level of significance

1% Critical value of 0.947 is less than 0.955589
Data is normally distributed at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Cobalt
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 59

Data Set Standard Deviation = 1.30016
Numerator = 4579.26
Denominator = 5147.63
W Statistic = 0.889587 = 4579.26 / 5147.63

5% Critical value of 0.962 exceeds 0.889587
Evidence of non-normality at 95% level of significance

1% Critical value of 0.945 exceeds 0.889587
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Fluoride
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 14 for 28 measurements

Sum of b values = 1.7709
Sample Standard Deviation = 0.485374
W Statistic = 0.493029

5% Critical value of 0.924 exceeds 0.493029
Evidence of non-normality at 95% level of significance

1% Critical value of 0.896 exceeds 0.493029
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Nickel
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 59

Data Set Standard Deviation = 1.06991
Numerator = 2809.16
Denominator = 3485.88
W Statistic = 0.805867 = 2809.16 / 3485.88

5% Critical value of 0.962 exceeds 0.805867
Evidence of non-normality at 95% level of significance

1% Critical value of 0.945 exceeds 0.805867
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Sulfate
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 55

Data Set Standard Deviation = 1.10011
Numerator = 2651.53
Denominator = 3183.67
W Statistic = 0.832854 = 2651.53 / 3183.67

5% Critical value of 0.958 exceeds 0.832854
Evidence of non-normality at 95% level of significance

1% Critical value of 0.94 exceeds 0.832854
Evidence of non-normality at 99% level of significance

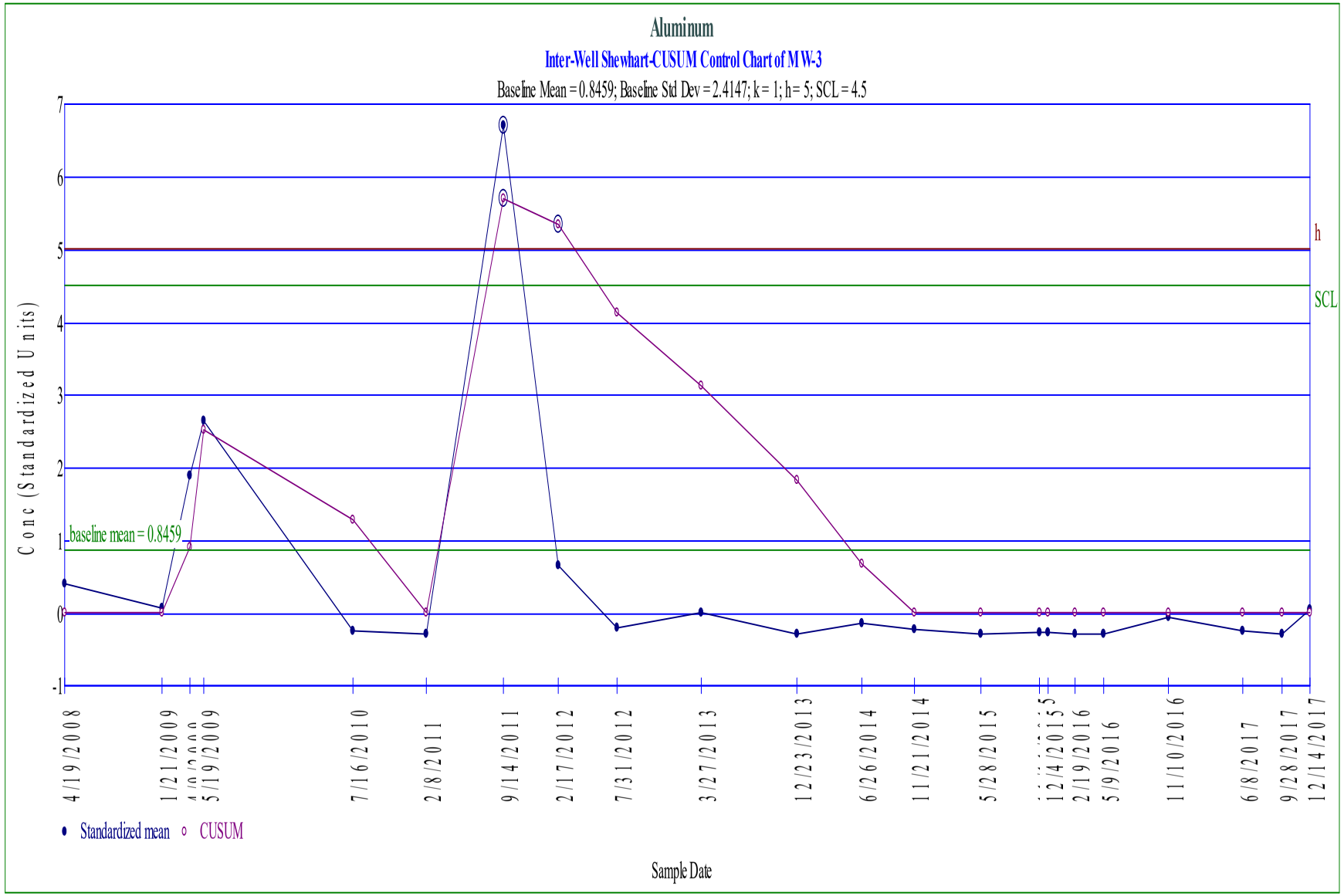
Shapiro-Francia Test of Normality

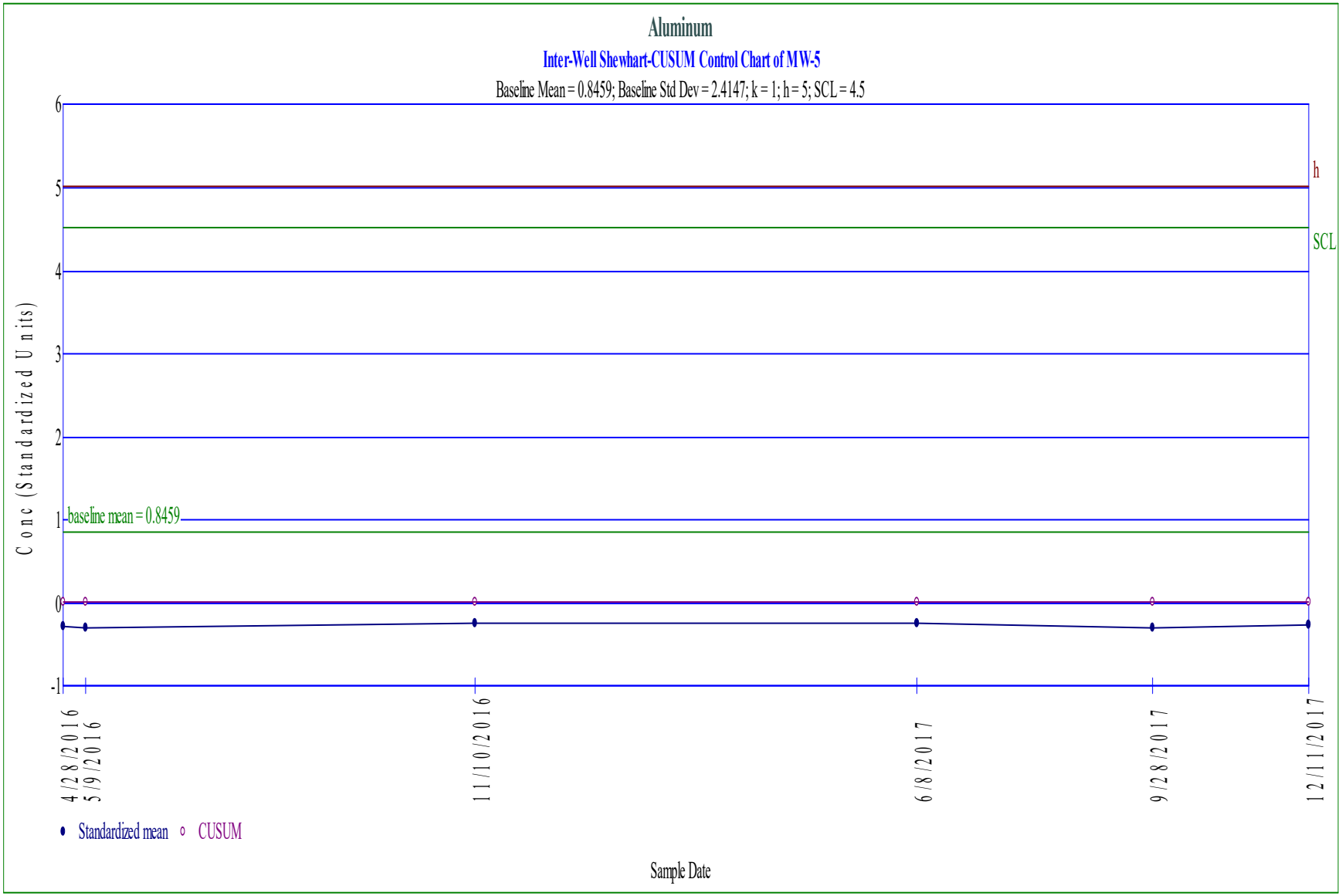
Parameter: Zinc
All Locations
Normality Test of Parameter Concentrations
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 59

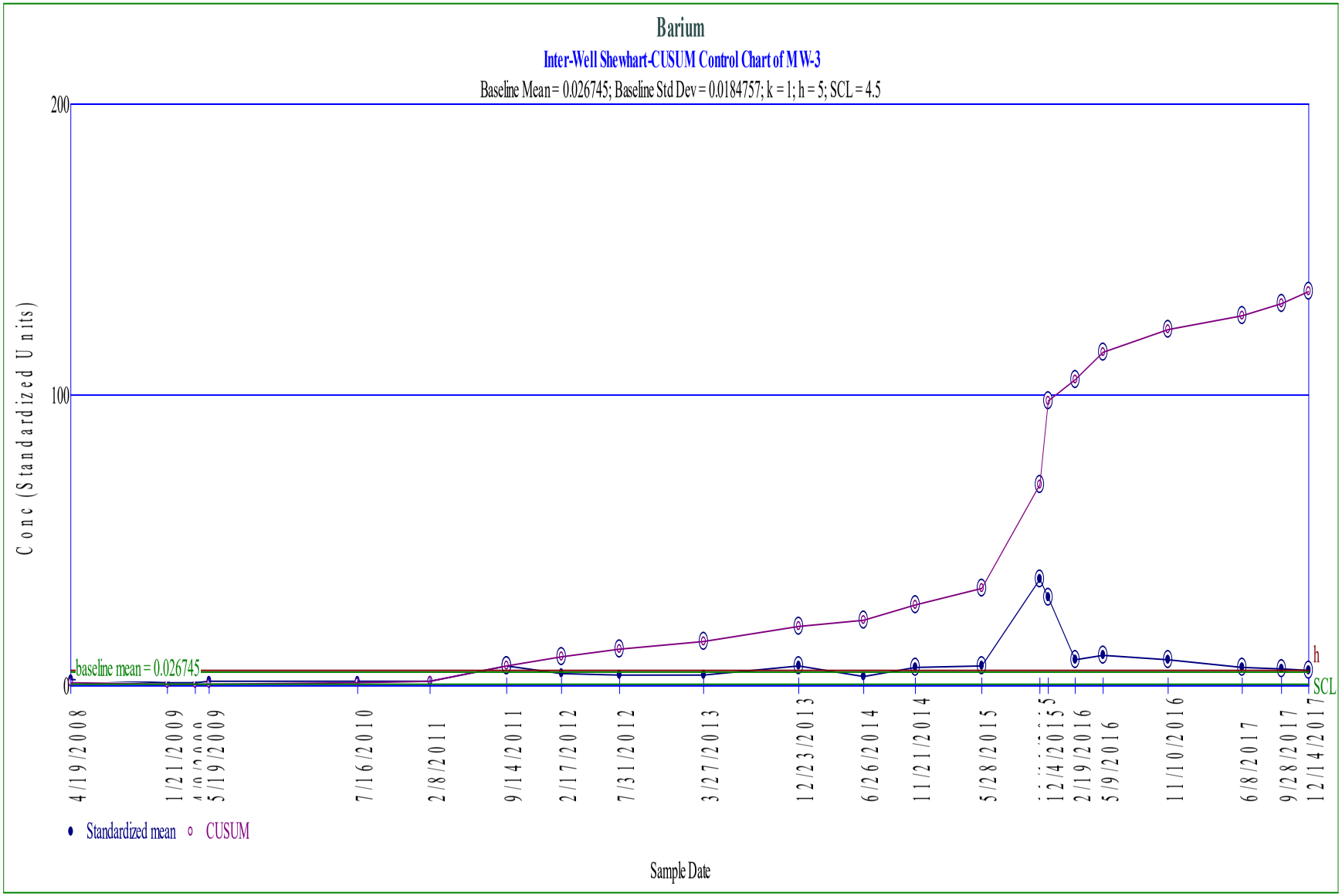
Data Set Standard Deviation = 0.767467
Numerator = 1268.7
Denominator = 1793.64
W Statistic = 0.707332 = 1268.7 / 1793.64

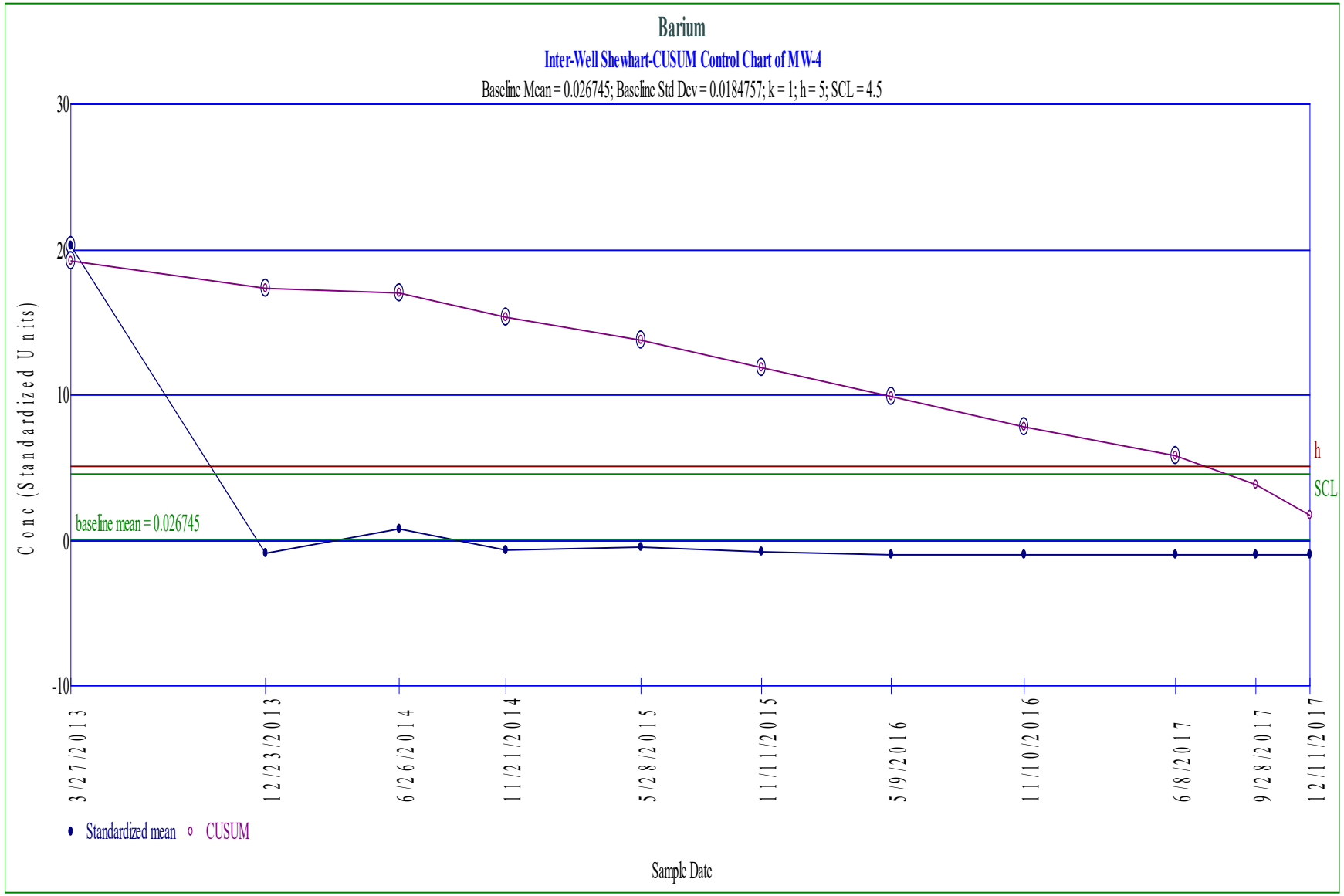
5% Critical value of 0.962 exceeds 0.707332
Evidence of non-normality at 95% level of significance

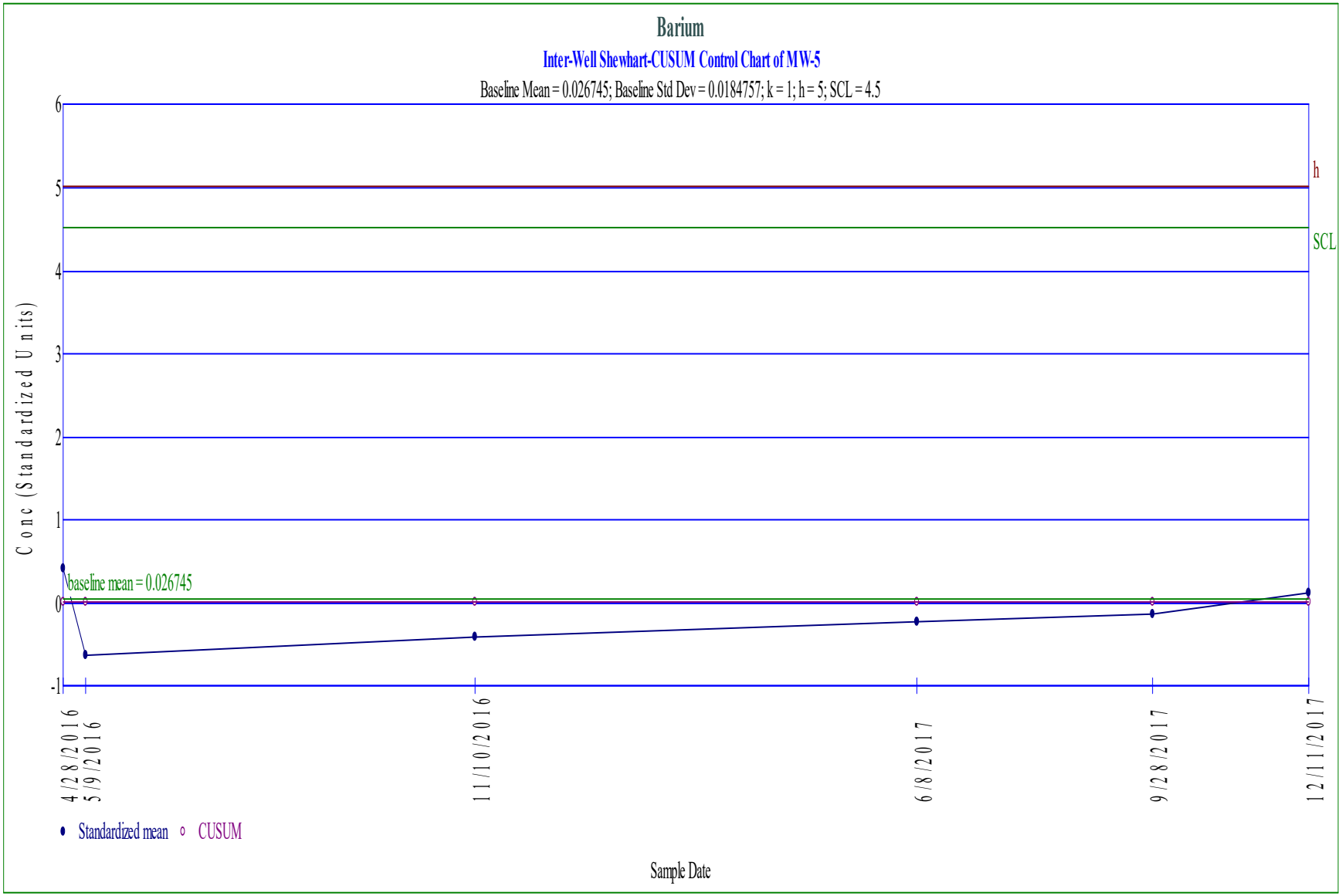
1% Critical value of 0.945 exceeds 0.707332
Evidence of non-normality at 99% level of significance

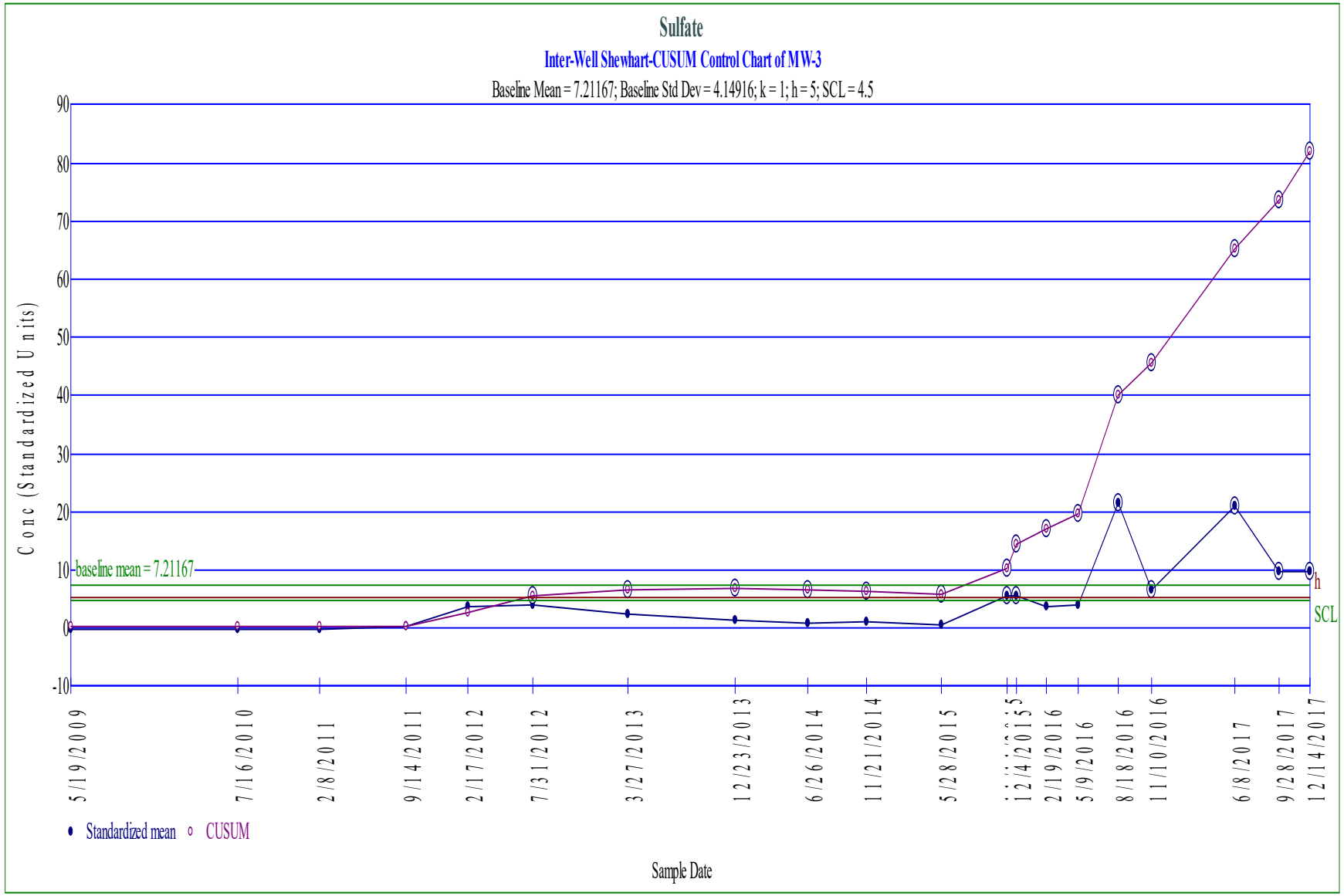

Aluminum
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 0.8459; Baseline Std Dev = 2.4147; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
7
6
5
4
3
2
1
0
-1
h
SCL
baseline mean = 0.8459
4/19/2008
1/21/2009
5/19/2009
7/16/2010
2/8/2011
9/14/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
12/4/2015
2/19/2016
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/14/2017
Standardized mean
CUSUM
Sample Date

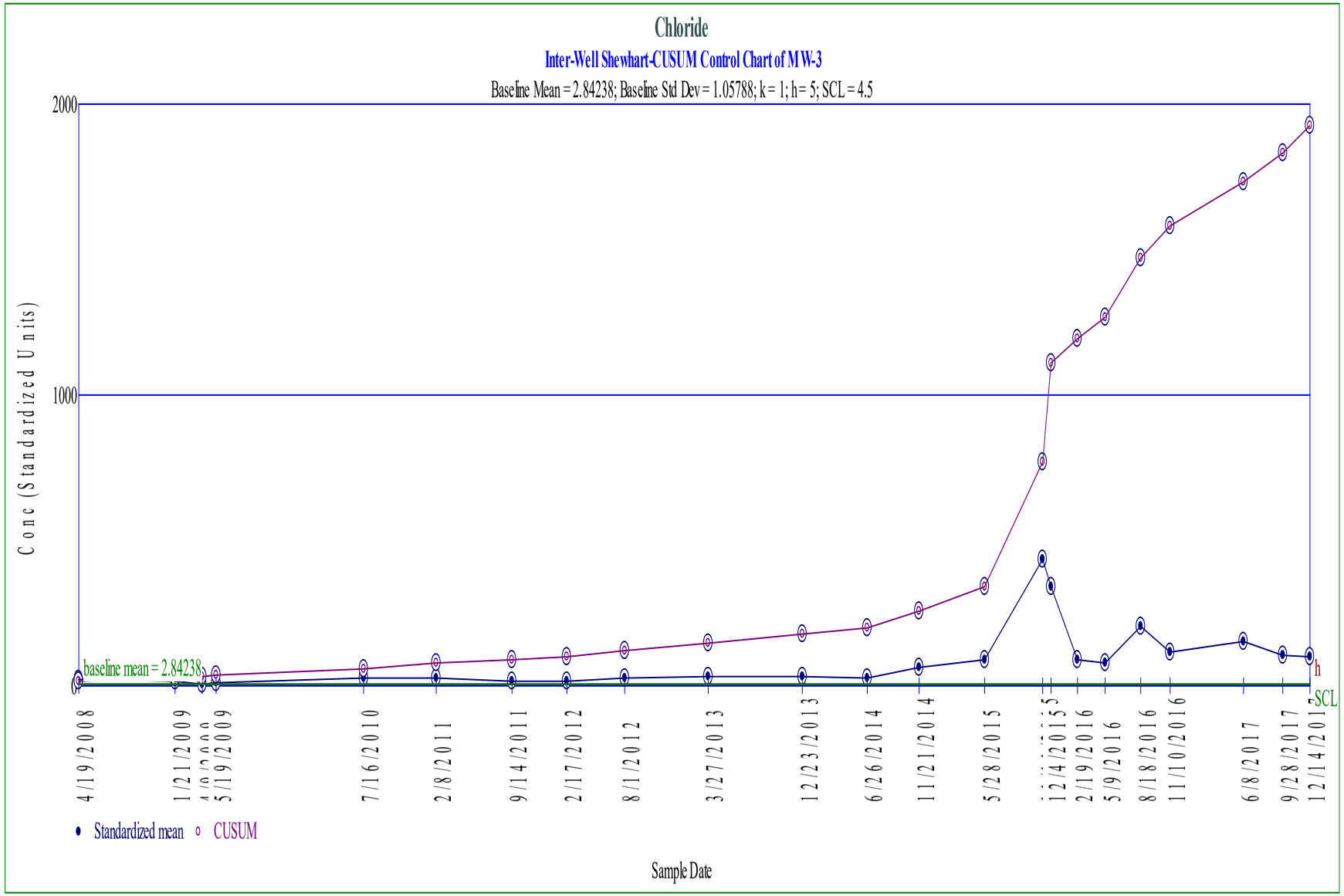

Aluminum
Inter-Well Shewhart-CUSUM Control Chart of MW-5
Baseline Mean = 0.8459; Baseline Std Dev = 2.4147; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
h
SCL
baseline mean = 0.8459
4/28/2016
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/11/2017
Standardized mean
CUSUM
Sample Date

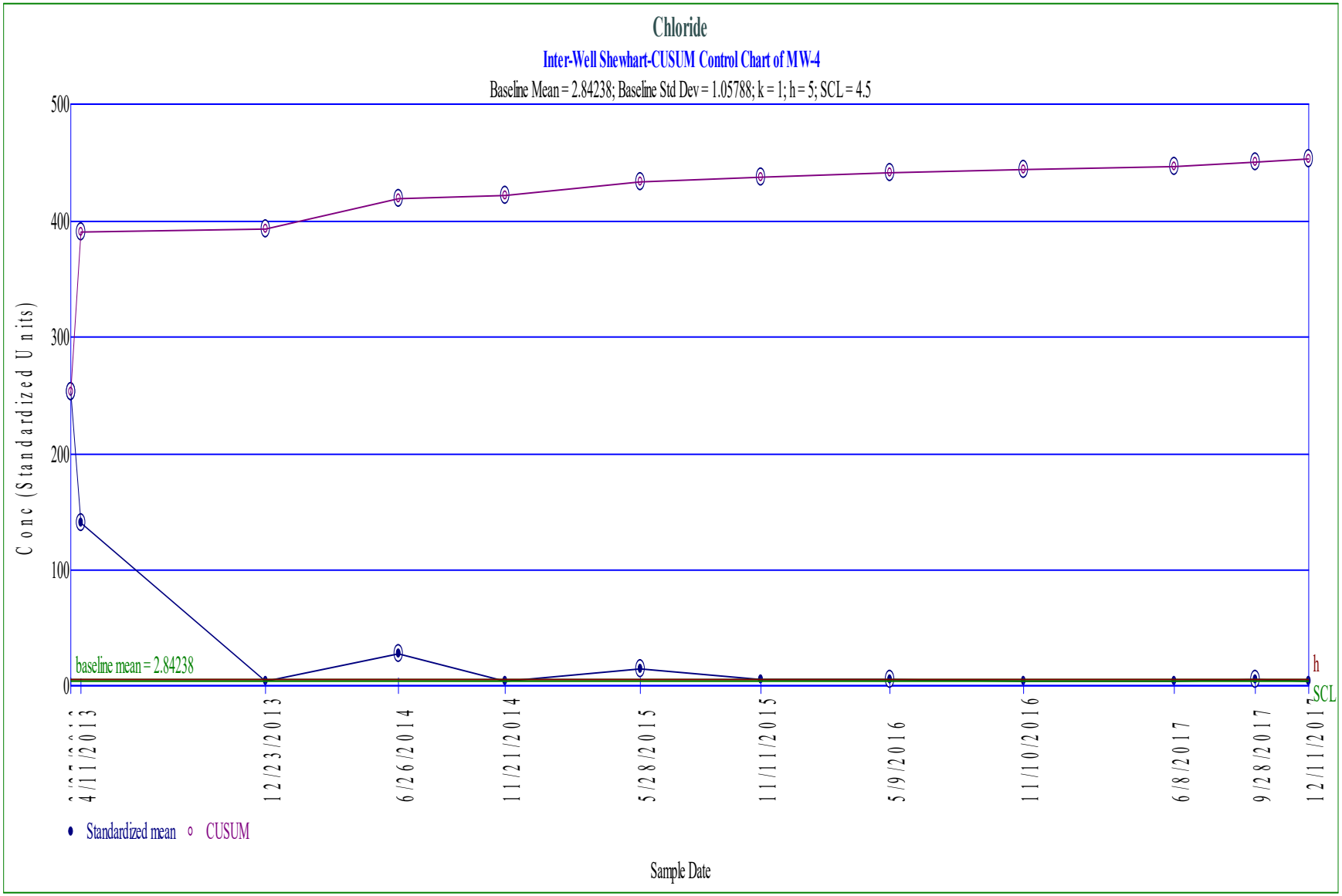

Barium
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 0.026745; Baseline Std Dev = 0.0184757; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
200
100
0
baseline mean = 0.026745
h
SCL
4/19/2008
1/21/2009
5/19/2009
7/16/2010
2/8/2011
9/14/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
12/4/2015
2/19/2016
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/14/2017
Standardized mean
CUSUM
Sample Date

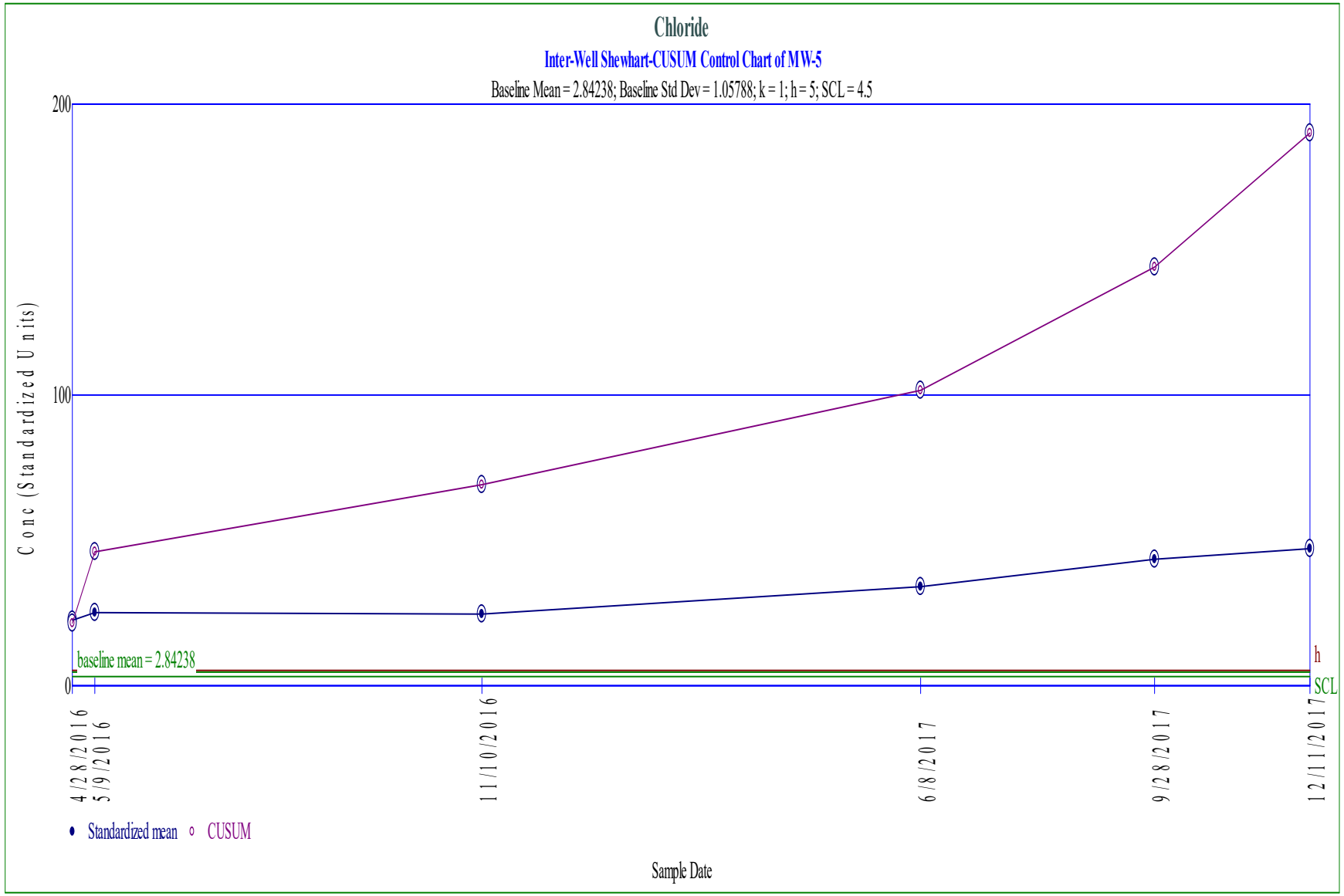

Barium
Inter-Well Shewhart-CUSUM Control Chart of MW-4
Baseline Mean = 0.026745; Baseline Std Dev = 0.0184757; k = 1; h = 5; SCL = 4.5
30
20
10
0
-10
Conc (Standardized Units)
h
SCL
baseline mean = 0.026745
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
11/11/2015
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/11/2017
Standardized mean
CUSUM
Sample Date


Barium
Inter-Well Shewhart-CUSUM Control Chart of MW-5
Baseline Mean = 0.026745; Baseline Std Dev = 0.0184757; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
h
SCL
baseline mean = 0.026745
4/28/2016
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/11/2017
Standardized mean
CUSUM
Sample Date


Sulfate
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 7.21167; Baseline Std Dev = 4.14916; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
90
80
70
60
50
40
30
20
10
0
-10
baseline mean = 7.21167
h
SCL
5/19/2009
7/16/2010
2/8/2011
9/14/2011
2/17/2012
7/31/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
12/4/2015
2/19/2016
5/9/2016
8/18/2016
11/10/2016
6/8/2017
9/28/2017
12/14/2017
Standardized mean
CUSUM
Sample Date


Chloride
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 2.84238; Baseline Std Dev = 1.05788; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
2000
1000
0
baseline mean = 2.84238
h
SCL
4/19/2008
1/21/2009
5/19/2009
7/16/2010
2/8/2011
9/14/2011
2/17/2012
8/1/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
12/4/2015
2/19/2016
5/9/2016
8/18/2016
11/10/2016
6/8/2017
9/28/2017
12/14/2017
Standardized mean
CUSUM
Sample Date


Chloride
Inter-Well Shewhart-CUSUM Control Chart of MW-4
Baseline Mean = 2.84238; Baseline Std Dev = 1.05788; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
500
400
300
200
100
0
baseline mean = 2.84238
h
SCL
4/11/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
11/11/2015
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/11/2017
Standardized mean
CUSUM
Sample Date


Chloride
Inter-Well Shewhart-CUSUM Control Chart of MW-5
Baseline Mean = 2.84238; Baseline Std Dev = 1.05788; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
200
100
0
baseline mean = 2.84238
h
SCL
4/28/2016
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/11/2017
Standardized mean
CUSUM
Sample Date

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Total Cadmium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 91.2281%
Number of comparisons = 3
Future Samples (k) = 3
Recent Dates = 1
Background Measurements (n) = 19
Maximum Background Value = 0.001
Confidence Level = 86.4%
False Positive Rate = 13.6%

Location	Date	Count	Mean	Significant
MW-3	**12/14/2017**	**1**	**0.00659**	**TRUE**
MW-4	12/11/2017	1	0.001	FALSE
MW-5	12/11/2017	1	0.001	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Cobalt

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 55.9322%
Number of comparisons = 3
Future Samples (k) = 3
Recent Dates = 1
Background Measurements (n) = 20
Maximum Background Value = 0.056
Confidence Level = 87%
False Positive Rate = 13%

Location	Date	Count	Mean	Significant
MW-3	12/14/2017	1	0.01	FALSE
MW-4	12/11/2017	1	0.002	FALSE
MW-5	12/11/2017	1	0.00245	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison
Parameter: Fluoride
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 82.1429%
Number of comparisons = 3
Future Samples (k) = 3
Recent Dates = 1
Background Measurements (n) = 9
Maximum Background Value = 0.178
Confidence Level = 75%
False Positive Rate = 25%

Location	Date	Count	Mean	Significant
MW-3	12/14/2017	1	0.149	FALSE
MW-4	12/11/2017	1	0.1	FALSE
MW-5	12/11/2017	1	0.1	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison
Parameter: Nickel
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 71.1864%
Number of comparisons = 3
Future Samples (k) = 3
Recent Dates = 1
Background Measurements (n) = 20
Maximum Background Value = 0.2
Confidence Level = 87%
False Positive Rate = 13%

Location	Date	Count	Mean	Significant
MW-3	12/14/2017	1	0.01	FALSE
MW-4	12/11/2017	1	0.002	FALSE
MW-5	12/11/2017	1	0.0211	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison
Parameter: Zinc
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 54.2373%
Number of comparisons = 3
Future Samples (k) = 3
Recent Dates = 1
Background Measurements (n) = 20
Maximum Background Value = 0.0281
Confidence Level = 87%
False Positive Rate = 13%

Location	Date	Count	Mean	Significant
MW-3	**12/14/2017**	**1**	**0.159**	**TRUE**
MW-4	12/11/2017	1	0.025	FALSE
MW-5	12/11/2017	1	0.025	FALSE

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Barium

Location: MW-3

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total non detects is 0
Non detect rank is 8

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	0.084	27
	1/21/2009	0.028	16
	4/9/2009	0.028	17
	5/19/2009	0.033	18
	7/16/2010	0.021	12
	2/8/2011	0.021	13
	9/14/2011	0.074	25
	2/17/2012	0.022	14
	7/31/2012	0.019	8
	3/27/2013	0.018	5
	12/23/2013	0.017	3
	6/26/2014	0.018	6
	11/21/2014	0.02	9
	5/28/2015	0.0188	7
	11/11/2015	0.0237	15
	5/9/2016	0.02	10
	11/10/2016	0.0207	11
	6/8/2017	0.0146	1
	9/28/2017	0.0175	4
	12/11/2017	0.0166	2
MW-3	4/19/2008	0.056	24
	1/21/2009	0.039	19
	4/9/2009	0.043	20
	5/19/2009	0.047	21
	7/16/2010	0.055	23
	2/8/2011	0.052	22
	9/14/2011	0.15	35
	2/17/2012	0.097	30
	7/31/2012	0.091	28
	3/27/2013	0.094	29

12/23/2013	0.15	36
6/26/2014	0.079	26
11/21/2014	0.14	34
5/28/2015	0.152	37
11/11/2015	0.701	42
12/4/2015	0.579	41
2/19/2016	0.186	38
5/9/2016	0.218	40
11/10/2016	0.188	39
6/8/2017	0.134	33
9/28/2017	0.125	32
12/14/2017	0.119	31

The Wilcoxon Statistic is 427
The Expected value is is 220
The Standard Deviation is 39.7073
The Z Score is 5.20056
The Standard Deviation adjusted for ties is 39.7073
The Z Score adjusted for ties is 5.20056
5.20056 > 2.326 indicating statistical significance at 1% level
5.20056 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Total Cadmium

Location: MW-3

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total non detects is 35
Non detect rank is 18

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	ND<0.001	18
	1/21/2009	ND<0.001	18
	4/9/2009	ND<0.001	18
	5/19/2009	ND<0.001	18
	7/16/2010	ND<0.001	18
	2/8/2011	ND<0.001	18
	9/14/2011	ND<0.001	18
	2/17/2012	ND<0.001	18
	7/31/2012	ND<0.001	18
	12/23/2013	ND<0.001	18
	6/26/2014	ND<0.001	18
	11/21/2014	ND<0.001	18
	5/28/2015	ND<0.001	18
	11/11/2015	ND<0.001	18
	5/9/2016	ND<0.001	18
	11/10/2016	ND<0.001	18
	6/8/2017	ND<0.001	18
	9/28/2017	ND<0.001	18
	12/11/2017	ND<0.001	18
MW-3	1/21/2009	ND<0.001	18
	4/9/2009	ND<0.001	18
	5/19/2009	ND<0.001	18
	7/16/2010	ND<0.001	18
	2/8/2011	ND<0.001	18
	9/14/2011	ND<0.001	18
	2/17/2012	ND<0.001	18
	7/31/2012	ND<0.001	18
	12/23/2013	ND<0.001	18
	6/26/2014	ND<0.001	18
	11/21/2014	ND<0.001	18

5/28/2015	ND<0.001	18
11/11/2015	ND<0.001	18
12/4/2015	ND<0.001	18
2/19/2016	ND<0.001	18
5/9/2016	ND<0.001	18
11/10/2016	0.00177	36
6/8/2017	0.0286	40
8/8/2017	0.0113	39
9/28/2017	0.00926	38
12/14/2017	0.00659	37

The Wilcoxon Statistic is 247
The Expected value is is 199.5
The Standard Deviation is 36.9222
The Z Score is 1.27295
The Standard Deviation adjusted for ties is 21.2168
The Z Score adjusted for ties is 2.21522
1.27295 < 2.326 indicating no statistical significance at 1% level
2.21522 < 2.326 indicating no statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Chloride
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total non detects is 0
Non detect rank is 18

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	2	4
	1/21/2009	2.9	14
	4/9/2009	1.9	3
	5/19/2009	2.8	12
	7/16/2010	2.8	13
	2/8/2011	2.6	11
	9/14/2011	3.1	16
	2/17/2012	2.1	6
	7/31/2012	2.2	8
	3/27/2013	1.8	2
	12/23/2013	1.5	1
	6/26/2014	2.9	15
	11/21/2014	3.9	17
	5/28/2015	2.01	5
	11/11/2015	3.97	18
	5/9/2016	2.12	7
	8/18/2016	2.4	10
	11/10/2016	4.59	20
	6/8/2017	5.68	21
	9/28/2017	4.11	19
	12/11/2017	2.31	9
MW-3	4/19/2008	20	27
	1/21/2009	14	24
	4/9/2009	8.2	22
	5/19/2009	10	23
	7/16/2010	25	28
	2/8/2011	25	29
	9/14/2011	15	25
	2/17/2012	18	26
	8/1/2012	25	30

3/27/2013	32	32
12/23/2013	35	33
6/26/2014	29	31
11/21/2014	65	34
5/28/2015	92.8	36
11/11/2015	458	44
12/4/2015	360	43
2/19/2016	96.1	37
5/9/2016	80.7	35
8/18/2016	218	42
11/10/2016	120	40
6/8/2017	163	41
9/28/2017	112	39
12/14/2017	104	38

The Wilcoxon Statistic is 483
The Expected value is is 241.5
The Standard Deviation is 42.5588
The Z Score is 5.66276
The Standard Deviation adjusted for ties is 42.5588
The Z Score adjusted for ties is 5.66276
5.66276 > 2.326 indicating statistical significance at 1% level
5.66276 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Chloride
Location: MW-4
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total non detects is 0
Non detect rank is 18

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	2	4
	1/21/2009	2.9	14
	4/9/2009	1.9	3
	5/19/2009	2.8	12
	7/16/2010	2.8	13
	2/8/2011	2.6	11
	9/14/2011	3.1	16
	2/17/2012	2.1	6
	7/31/2012	2.2	8
	3/27/2013	1.8	2
	12/23/2013	1.5	1
	6/26/2014	2.9	15
	11/21/2014	3.9	17
	5/28/2015	2.01	5
	11/11/2015	3.97	18
	5/9/2016	2.12	7
	8/18/2016	2.4	10
	11/10/2016	4.59	20
	6/8/2017	5.68	21
	9/28/2017	4.11	19
	12/11/2017	2.31	9
MW-4	3/27/2013	270	33
	4/11/2013	150	32
	12/23/2013	6.4	22
	6/26/2014	31	31
	11/21/2014	6.7	25
	5/28/2015	17.5	30
	11/11/2015	7.34	27
	5/9/2016	7.91	29
	11/10/2016	6.61	23

6/8/2017	6.67	24
9/28/2017	7.88	28
12/11/2017	6.76	26

The Wilcoxon Statistic is 252
The Expected value is is 126
The Standard Deviation is 26.7208
The Z Score is 4.69672
The Standard Deviation adjusted for ties is 26.7208
The Z Score adjusted for ties is 4.69672
4.69672 > 2.326 indicating statistical significance at 1% level
4.69672 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Chloride
Location: MW-5
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total non detects is 0
Non detect rank is 18

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	2	4
	1/21/2009	2.9	14
	4/9/2009	1.9	3
	5/19/2009	2.8	12
	7/16/2010	2.8	13
	2/8/2011	2.6	11
	9/14/2011	3.1	16
	2/17/2012	2.1	6
	7/31/2012	2.2	8
	3/27/2013	1.8	2
	12/23/2013	1.5	1
	6/26/2014	2.9	15
	11/21/2014	3.9	17
	5/28/2015	2.01	5
	11/11/2015	3.97	18
	5/9/2016	2.12	7
	8/18/2016	2.4	10
	11/10/2016	4.59	20
	6/8/2017	5.68	21
	9/28/2017	4.11	19
	12/11/2017	2.31	9
MW-5	4/28/2016	26.6	22
	5/9/2016	29.4	24
	11/10/2016	28.6	23
	6/8/2017	38.4	25
	9/28/2017	48.7	26
	12/11/2017	52.5	27

The Wilcoxon Statistic is 126

The Expected value is is 63
The Standard Deviation is 17.1464
The Z Score is 3.64507
The Standard Deviation adjusted for ties is 17.1464
The Z Score adjusted for ties is 3.64507
3.64507 > 2.326 indicating statistical significance at 1% level
3.64507 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Sulfate
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total non detects is 10
Non detect rank is 5.5

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	5/19/2009	8.9	18
	7/16/2010	9.4	21
	2/8/2011	5.8	14
	9/14/2011	6.6	16
	2/17/2012	ND<5	5.5
	7/31/2012	ND<5	5.5
	3/27/2013	5.1	12
	12/23/2013	6.1	15
	6/26/2014	ND<5	5.5
	11/21/2014	9.1	20
	5/28/2015	ND<5	5.5
	11/11/2015	18.8	27
	5/9/2016	ND<5	5.5
	8/18/2016	3.51	11
	11/10/2016	16.5	26
	6/8/2017	ND<5	5.5
	9/28/2017	ND<5	5.5
	12/11/2017	ND<5	5.5
MW-3	5/19/2009	ND<5	5.5
	7/16/2010	5.1	13
	2/8/2011	ND<5	5.5
	9/14/2011	7.3	17
	2/17/2012	22	28
	7/31/2012	23	31
	3/27/2013	16	25
	12/23/2013	12	24
	6/26/2014	9.7	22
	11/21/2014	11	23
	5/28/2015	9.09	19
	11/11/2015	29.3	33

12/4/2015	29.1	32
2/19/2016	22.2	29
5/9/2016	22.3	30
8/18/2016	95.7	38
11/10/2016	34	34
6/8/2017	93.7	37
9/28/2017	46.2	35
12/14/2017	46.2	36

The Wilcoxon Statistic is 307
The Expected value is is 180
The Standard Deviation is 34.2053
The Z Score is 3.69826
The Standard Deviation adjusted for ties is 33.8951
The Z Score adjusted for ties is 3.73211
3.69826 > 2.326 indicating statistical significance at 1% level
3.73211 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Zinc
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total non detects is 19
Non detect rank is 10

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	0.011	20
	1/21/2009	0.015	27
	4/9/2009	0.011	21
	5/19/2009	0.021	33
	7/16/2010	0.011	22
	2/8/2011	0.016	30
	9/14/2011	0.022	34
	2/17/2012	ND<0.01	10
	7/31/2012	0.023	35
	3/27/2013	0.012	24
	12/23/2013	ND<0.01	10
	6/26/2014	ND<0.01	10
	11/21/2014	ND<0.025	10
	5/28/2015	ND<0.025	10
	11/11/2015	ND<0.025	10
	5/9/2016	0.0281	38
	11/10/2016	ND<0.025	10
	6/8/2017	ND<0.025	10
	9/28/2017	ND<0.025	10
	12/11/2017	ND<0.025	10
MW-3	4/19/2008	0.017	32
	1/21/2009	0.015	28
	4/9/2009	0.011	23
	5/19/2009	0.031	39
	7/16/2010	0.015	29
	2/8/2011	0.013	25
	9/14/2011	0.024	37
	2/17/2012	0.014	26
	7/31/2012	0.016	31
	3/27/2013	ND<0.01	10

12/23/2013	ND<0.01	10
6/26/2014	0.023	36
11/21/2014	ND<0.025	10
5/28/2015	ND<0.025	10
11/11/2015	ND<0.025	10
12/4/2015	ND<0.025	10
2/19/2016	ND<0.025	10
5/9/2016	ND<0.025	10
11/10/2016	ND<0.025	10
6/8/2017	0.0769	41
9/28/2017	0.0439	40
12/14/2017	0.159	42

The Wilcoxon Statistic is 266
The Expected value is is 220
The Standard Deviation is 39.7073
The Z Score is 1.14589
The Standard Deviation adjusted for ties is 37.8289
The Z Score adjusted for ties is 1.20279
1.14589 < 2.326 indicating no statistical significance at 1% level
1.20279 < 2.326 indicating no statistical significance at 1% level when adjusted for ties

Mann-Kendall Trend Analysis

Parameter: Aluminum
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 71 - 158 = -87

Tied Group	Value	Members
1	0.1	2
2	0.2	2

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
9/14/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1

There are 0 time periods with multiple data

A = 36
B = 0
C = 0
D = 0

E = 4
F = 0
a = 22638
b = 83160
c = 924
Group Variance = 1255.67
Z-Score = -2.42695
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-2.42695 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

Parameter: Aluminum
Location: MW-5
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 8 - 6 = 2
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |2| is 0.86
0.86 >= 0.025 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Barium
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 174 - 56 = 118

Tied Group	Value	Members
1	0.15	2

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
9/14/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0
E = 2

F = 0
a = 22638
b = 83160
c = 924
Group Variance = 1256.67
Z-Score = 3.30047
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.30047 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Barium
Location: MW-4
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 10 - 45 = -35

Tied Group	Value	Members

Time Period	Observations
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 2970
b = 8910
c = 220
Group Variance = 165
Z-Score = -2.6469
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-2.6469 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

Parameter: Barium
Location: MW-5
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 10 - 5 = 5
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |5| is 0.47
0.47 >= 0.025 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Total Cadmium
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 84 - 6 = 78

Tied Group	Value	Members
1	0.001	16

Time Period	Observations
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
9/14/2011	1
2/17/2012	1
7/31/2012	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
8/8/2017	1
9/28/2017	1
12/14/2017	1

There are 0 time periods with multiple data

A = 8880
B = 0
C = 3360
D = 0
E = 240
F = 0

a = 19740
b = 71820
c = 840
Group Variance = 603.333
Z-Score = 3.13482
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.13482 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 211 - 39 = 172

Tied Group	Value	Members
1	25	3

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
9/14/2011	1
2/17/2012	1
8/1/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
8/18/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1

There are 0 time periods with multiple data

A = 66
B = 0
C = 6
D = 0

E = 6
F = 0
a = 25806
b = 95634
c = 1012
Group Variance = 1430
Z-Score = 4.52197
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.52197 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: MW-4
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 21 - 45 = -24

Tied Group	Value	Members

Time Period	Observations
3/27/2013	1
4/11/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 3828
b = 11880
c = 264
Group Variance = 212.667
Z-Score = -1.57717
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-1.57717| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: MW-5
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 14 - 1 = 13
Comparing at 95% confidence level (upward trend)
Probability of obtaining S >= 13 is 0.0083
S > 0 and 0.0083 < 0.05 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Cobalt
Location: MW-5
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 5 - 10 = -5
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |-5| is 0.47
0.47 >= 0.025 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Fluoride
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 19 - 3 = 16
Comparing at 95% confidence level (upward trend)
Probability of obtaining S >= 16 is 0.031
S > 0 and 0.031 < 0.05 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Nickel
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 11 - 136 = -125

Tied Group	Value	Members
1	0.02	13
2	0.01	3
3	0.002	3

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
9/14/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1

There are 0 time periods with multiple data

A = 4968
B = 0
C = 1728

D = 0
E = 168
F = 0
a = 22638
b = 83160
c = 924
Group Variance = 981.667
Z-Score = -3.95767
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-3.95767 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

Parameter: Nickel
Location: MW-5
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 10 - 5 = 5
Comparing at 1.0 - (0.05 / 2) = 97.5% confidence level (two-tailed)
Probability of obtaining S >= |5| is 0.47
0.47 >= 0.025 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Sulfate
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 155 - 33 = 122

Tied Group	Value	Members
1	5	2
2	46.2	2

Time Period	Observations
5/19/2009	1
7/16/2010	1
2/8/2011	1
9/14/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
8/18/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1

There are 0 time periods with multiple data

A = 36
B = 0
C = 0
D = 0
E = 4
F = 0

a = 17100
b = 61560
c = 760
Group Variance = 948
Z-Score = 3.9299
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.9299 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Zinc
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 162 - 46 = 116

Tied Group	Value	Members
1	0.015	2
2	0.01	2
3	0.025	7

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
9/14/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1

There are 0 time periods with multiple data

A = 834
B = 0
C = 210

D = 0
E = 46
F = 0
a = 22638
b = 83160
c = 924
Group Variance = 1211.33
Z-Score = 3.3042
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.3042 > 1.65463 indicating an upward trend

APPENDIX C
LABORATORY ANALYTICAL REPORT & FIELD INFORMATION LOGS

ANALYTICAL REPORT

December 21, 2017

Civil & Environmental Consultants - TN

Sample Delivery Group:	L957143
Samples Received:	12/13/2017
Project Number:	142-059
Description:	EWS Landfill GW Assessment

Report To: Philip Campbell
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Entire Report Reviewed By:

John Hawkins
Technical Service Representative

TABLE OF CONTENTS

Cp: Cover Page 1

Tc: Table of Contents 2

Ss: Sample Summary 3

Cn: Case Narrative 6

Sr: Sample Results 7

- MW-1 L957143-01 7
- MW-4 L957143-02 10
- MW-5 L957143-03 13
- TMW-1 L957143-04 16
- TMW-2 L957143-05 19
- TMW-3 L957143-06 22
- DUPLICATE L957143-07 25
- FIELD BLANK L957143-08 28
- TRIP BLANK L957143-09 31

Qc: Quality Control Summary 32

- Wet Chemistry by Method 130.1 32
- Wet Chemistry by Method 2320 B-2011 33
- Wet Chemistry by Method 350.1 34
- Wet Chemistry by Method 410.4 35
- Wet Chemistry by Method 9056A 36
- Mercury by Method 7470A 38
- Metals (ICP) by Method 6010B 40
- Metals (ICPMS) by Method 6020 42
- Volatile Organic Compounds (GC/MS) by Method 8260B 46
- EDB / DBCP by Method 8011 49

Gl: Glossary of Terms 50

Al: Accreditations & Locations 51

Sc: Sample Chain of Custody 52

MW-1 L957143-01 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	12/11/17 11:00	12/13/17 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:17	12/19/17 09:17	KK
Wet Chemistry by Method 2320 B-2011	WG1053330	1	12/15/17 13:40	12/15/17 13:40	MCG
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 13:51	12/19/17 13:51	JER
Wet Chemistry by Method 410.4	WG1053197	1	12/13/17 21:31	12/14/17 00:13	MZ
Wet Chemistry by Method 9056A	WG1053102	1	12/13/17 14:50	12/13/17 14:50	DR
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:06	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 20:53	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 17:06	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 16:35	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 19:21	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 21:54	LAT
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1053252	1	12/13/17 20:58	12/13/17 20:58	JHH
EDB / DBCP by Method 8011	WG1053899	1	12/15/17 09:05	12/15/17 20:39	KLM

MW-4 L957143-02 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	12/11/17 17:00	12/13/17 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:19	12/19/17 09:19	KK
Wet Chemistry by Method 2320 B-2011	WG1053330	1	12/15/17 13:28	12/15/17 13:28	MCG
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 14:52	12/19/17 14:52	JER
Wet Chemistry by Method 410.4	WG1053197	1	12/13/17 21:31	12/14/17 00:13	MZ
Wet Chemistry by Method 9056A	WG1053102	1	12/13/17 14:36	12/13/17 14:36	DR
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 08:55	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 20:44	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 17:09	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 16:45	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 19:25	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 21:58	LAT
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1053252	1	12/13/17 21:17	12/13/17 21:17	JHH
EDB / DBCP by Method 8011	WG1053899	1	12/15/17 09:05	12/15/17 20:51	KLM

MW-5 L957143-03 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	12/11/17 12:10	12/13/17 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:21	12/19/17 09:21	KK
Wet Chemistry by Method 2320 B-2011	WG1053330	1	12/15/17 13:46	12/15/17 13:46	MCG
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 14:55	12/19/17 14:55	JER
Wet Chemistry by Method 410.4	WG1053197	1	12/13/17 21:31	12/14/17 00:14	MZ
Wet Chemistry by Method 9056A	WG1053102	1	12/13/17 15:04	12/13/17 15:04	DR
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:08	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 20:55	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 17:13	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 16:48	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 19:40	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 14:02	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 22:10	LAT
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1053252	1	12/13/17 21:37	12/13/17 21:37	JHH
EDB / DBCP by Method 8011	WG1053899	1	12/15/17 09:05	12/15/17 21:02	KLM

TMW-1 L957143-04 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	12/11/17 13:45	12/13/17 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:22	12/19/17 09:22	KK
Wet Chemistry by Method 2320 B-2011	WG1053330	1	12/15/17 13:51	12/15/17 13:51	MCG
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 14:57	12/19/17 14:57	JER
Wet Chemistry by Method 410.4	WG1053197	1	12/13/17 21:31	12/14/17 00:14	MZ
Wet Chemistry by Method 9056A	WG1053102	1	12/13/17 13:43	12/13/17 13:43	DR
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:17	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:04	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 17:23	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 16:50	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 19:44	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 14:06	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 22:24	LAT
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1053252	1	12/13/17 21:56	12/13/17 21:56	JHH
EDB / DBCP by Method 8011	WG1053899	1	12/15/17 09:05	12/15/17 21:13	KLM

TMW-2 L957143-05 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	12/11/17 15:15	12/13/17 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:23	12/19/17 09:23	KK
Wet Chemistry by Method 2320 B-2011	WG1053330	1	12/15/17 13:56	12/15/17 13:56	MCG
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 14:58	12/19/17 14:58	JER
Wet Chemistry by Method 410.4	WG1053197	2	12/13/17 21:31	12/14/17 00:15	MZ
Wet Chemistry by Method 9056A	WG1053102	1	12/13/17 14:09	12/13/17 14:09	DR
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:20	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:07	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 17:26	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 16:58	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 19:48	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 14:10	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 22:28	LAT
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1053252	1	12/13/17 22:16	12/13/17 22:16	JHH
EDB / DBCP by Method 8011	WG1053899	1	12/15/17 09:05	12/15/17 21:25	KLM

TMW-3 L957143-06 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	12/11/17 16:10	12/13/17 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:24	12/19/17 09:24	KK
Wet Chemistry by Method 2320 B-2011	WG1053330	1	12/15/17 14:02	12/15/17 14:02	MCG
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 15:00	12/19/17 15:00	JER
Wet Chemistry by Method 410.4	WG1053197	1	12/13/17 21:31	12/14/17 00:15	MZ
Wet Chemistry by Method 9056A	WG1053102	1	12/13/17 14:23	12/13/17 14:23	DR
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:22	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:09	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 17:29	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 17:01	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 19:52	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 14:14	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 22:32	LAT
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1053252	1	12/13/17 22:35	12/13/17 22:35	JHH
EDB / DBCP by Method 8011	WG1053899	1	12/15/17 09:05	12/15/17 21:36	KLM

DUPLICATE L957143-07 GW

Collected by: Philip Campbell
Collected date/time: 12/11/17 00:00
Received date/time: 12/13/17 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:25	12/19/17 09:25	KK
Wet Chemistry by Method 2320 B-2011	WG1053330	1	12/15/17 14:07	12/15/17 14:07	MCG
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 15:01	12/19/17 15:01	JER
Wet Chemistry by Method 410.4	WG1053197	1	12/13/17 21:31	12/14/17 00:15	MZ
Wet Chemistry by Method 9056A	WG1053102	1	12/13/17 16:12	12/13/17 16:12	DR
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:24	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:11	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 17:33	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 17:04	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 19:55	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 14:18	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 22:36	LAT
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1053252	1	12/13/17 22:54	12/13/17 22:54	JHH
EDB / DBCP by Method 8011	WG1053899	1	12/15/17 09:05	12/15/17 21:48	KLM

FIELD BLANK L957143-08 GW

Collected by: Philip Campbell
Collected date/time: 12/11/17 14:35
Received date/time: 12/13/17 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:25	12/19/17 09:25	KK
Wet Chemistry by Method 2320 B-2011	WG1053330	1	12/15/17 14:12	12/15/17 14:12	MCG
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 15:03	12/19/17 15:03	JER
Wet Chemistry by Method 410.4	WG1053197	1	12/13/17 21:31	12/14/17 00:15	MZ
Wet Chemistry by Method 9056A	WG1053102	1	12/13/17 13:56	12/13/17 13:56	DR
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:26	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:14	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 17:36	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 17:06	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 19:59	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 14:22	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 22:40	LAT
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1053252	1	12/13/17 23:14	12/13/17 23:14	JHH
EDB / DBCP by Method 8011	WG1053899	1	12/15/17 09:05	12/15/17 21:59	KLM

TRIP BLANK L957143-09 GW

Collected by: Philip Campbell
Collected date/time: 12/11/17 00:00
Received date/time: 12/13/17 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1053252	1	12/13/17 20:38	12/13/17 20:38	JHH

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

John Hawkins
Technical Service Representative

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	ND		30.0	1	12/19/2017 09:17	WG1054865

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	52.0		20.0	1	12/15/2017 13:40	WG1053330

Sample Narrative:
L957143-01 WG1053330: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	0.103	P1	0.100	1	12/19/2017 13:51	WG1053808

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	12/14/2017 00:13	WG1053197

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/13/2017 14:50	WG1053102
Chloride	2.31		1.00	1	12/13/2017 14:50	WG1053102
Fluoride	ND		0.100	1	12/13/2017 14:50	WG1053102
Nitrate	ND	T8	0.100	1	12/13/2017 14:50	WG1053102
Sulfate	ND		5.00	1	12/13/2017 14:50	WG1053102

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	0.000473		0.000200	1	12/15/2017 09:06	WG1053452
Mercury,Dissolved	0.000220	B	0.000200	1	12/14/2017 20:53	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 16:35	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 17:06	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	12/18/2017 21:54	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 19:21	WG1053312
Antimony	ND		0.00200	1	12/18/2017 21:54	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 19:21	WG1053312
Arsenic	0.0573		0.00200	1	12/18/2017 21:54	WG1053414
Arsenic,Dissolved	0.0624		0.00200	1	12/19/2017 19:21	WG1053312
Barium	0.0166		0.00500	1	12/18/2017 21:54	WG1053414
Barium,Dissolved	0.0167		0.00500	1	12/19/2017 19:21	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	12/18/2017 21:54	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/19/2017 19:21	WG1053312
Cadmium	ND		0.00100	1	12/18/2017 21:54	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/19/2017 19:21	WG1053312
Calcium	3.31		1.00	1	12/18/2017 21:54	WG1053414
Calcium,Dissolved	3.33		1.00	1	12/19/2017 19:21	WG1053312
Chromium	ND		0.00200	1	12/18/2017 21:54	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 19:21	WG1053312
Cobalt	0.0411		0.00200	1	12/18/2017 21:54	WG1053414
Cobalt,Dissolved	0.0450		0.00200	1	12/19/2017 19:21	WG1053312
Copper	ND		0.00500	1	12/18/2017 21:54	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 19:21	WG1053312
Iron	14.3		0.100	1	12/18/2017 21:54	WG1053414
Iron,Dissolved	16.0		0.100	1	12/19/2017 19:21	WG1053312
Lead	ND		0.00200	1	12/18/2017 21:54	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 19:21	WG1053312
Magnesium	2.69		1.00	1	12/18/2017 21:54	WG1053414
Magnesium,Dissolved	2.83		1.00	1	12/19/2017 19:21	WG1053312
Manganese	0.921		0.00500	1	12/18/2017 21:54	WG1053414
Manganese,Dissolved	1.03		0.00500	1	12/19/2017 19:21	WG1053312
Nickel	0.00652		0.00200	1	12/18/2017 21:54	WG1053414
Nickel,Dissolved	0.00611		0.00200	1	12/19/2017 19:21	WG1053312
Potassium	1.22		1.00	1	12/18/2017 21:54	WG1053414
Potassium,Dissolved	1.29		1.00	1	12/19/2017 19:21	WG1053312
Selenium	ND		0.00200	1	12/18/2017 21:54	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 19:21	WG1053312
Silver	ND		0.00200	1	12/18/2017 21:54	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 19:21	WG1053312
Sodium	3.23		1.00	1	12/18/2017 21:54	WG1053414
Sodium,Dissolved	3.18		1.00	1	12/19/2017 19:21	WG1053312
Thallium	ND		0.00200	1	12/18/2017 21:54	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 19:21	WG1053312
Vanadium	ND		0.00500	1	12/18/2017 21:54	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 19:21	WG1053312
Zinc	ND		0.0250	1	12/18/2017 21:54	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 19:21	WG1053312

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J4	0.0500	1	12/13/2017 20:58	WG1053252
Acrylonitrile	ND		0.0100	1	12/13/2017 20:58	WG1053252
Benzene	ND		0.00100	1	12/13/2017 20:58	WG1053252
Bromochloromethane	ND		0.00100	1	12/13/2017 20:58	WG1053252
Bromodichloromethane	ND		0.00100	1	12/13/2017 20:58	WG1053252
Bromoform	ND		0.00100	1	12/13/2017 20:58	WG1053252
Bromomethane	ND		0.00500	1	12/13/2017 20:58	WG1053252
Carbon disulfide	ND		0.00100	1	12/13/2017 20:58	WG1053252
Carbon tetrachloride	ND		0.00100	1	12/13/2017 20:58	WG1053252
Chlorobenzene	ND		0.00100	1	12/13/2017 20:58	WG1053252
Chlorodibromomethane	ND		0.00100	1	12/13/2017 20:58	WG1053252
Chloroethane	ND		0.00500	1	12/13/2017 20:58	WG1053252
Chloroform	ND		0.00500	1	12/13/2017 20:58	WG1053252
Chloromethane	ND		0.00250	1	12/13/2017 20:58	WG1053252
Dibromomethane	ND		0.00100	1	12/13/2017 20:58	WG1053252
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	12/13/2017 20:58	WG1053252

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	12/13/2017 20:58	WG1053252
1,2-Dichlorobenzene	ND		0.00100	1	12/13/2017 20:58	WG1053252
1,4-Dichlorobenzene	ND		0.00100	1	12/13/2017 20:58	WG1053252
trans-1,4-Dichloro-2-butene	ND		0.00250	1	12/13/2017 20:58	WG1053252
1,1-Dichloroethane	ND		0.00100	1	12/13/2017 20:58	WG1053252
1,2-Dichloroethane	ND		0.00100	1	12/13/2017 20:58	WG1053252
1,1-Dichloroethene	ND		0.00100	1	12/13/2017 20:58	WG1053252
cis-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 20:58	WG1053252
trans-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 20:58	WG1053252
1,2-Dichloropropane	ND		0.00100	1	12/13/2017 20:58	WG1053252
cis-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 20:58	WG1053252
trans-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 20:58	WG1053252
Ethylbenzene	ND		0.00100	1	12/13/2017 20:58	WG1053252
2-Hexanone	ND		0.0100	1	12/13/2017 20:58	WG1053252
Iodomethane	ND		0.0100	1	12/13/2017 20:58	WG1053252
2-Butanone (MEK)	ND		0.0100	1	12/13/2017 20:58	WG1053252
Methylene Chloride	ND		0.00500	1	12/13/2017 20:58	WG1053252
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	12/13/2017 20:58	WG1053252
Styrene	ND		0.00100	1	12/13/2017 20:58	WG1053252
1,1,1,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 20:58	WG1053252
1,1,2,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 20:58	WG1053252
Tetrachloroethene	ND		0.00100	1	12/13/2017 20:58	WG1053252
Toluene	ND		0.00100	1	12/13/2017 20:58	WG1053252
1,1,1-Trichloroethane	ND		0.00100	1	12/13/2017 20:58	WG1053252
1,1,2-Trichloroethane	ND		0.00100	1	12/13/2017 20:58	WG1053252
Trichloroethene	ND		0.00100	1	12/13/2017 20:58	WG1053252
Trichlorofluoromethane	ND		0.00500	1	12/13/2017 20:58	WG1053252
1,2,3-Trichloropropane	ND		0.00250	1	12/13/2017 20:58	WG1053252
Vinyl acetate	ND		0.0100	1	12/13/2017 20:58	WG1053252
Vinyl chloride	ND		0.00100	1	12/13/2017 20:58	WG1053252
Xylenes, Total	ND		0.00300	1	12/13/2017 20:58	WG1053252
(S) Toluene-d8	*109*		*80.0-120*		*12/13/2017 20:58*	WG1053252
(S) Dibromofluoromethane	*102*		*76.0-123*		*12/13/2017 20:58*	WG1053252
(S) a,a,a-Trifluorotoluene	*97.0*		*80.0-120*		*12/13/2017 20:58*	WG1053252
(S) 4-Bromofluorobenzene	*104*		*80.0-120*		*12/13/2017 20:58*	WG1053252

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	12/15/2017 20:39	WG1053899
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	12/15/2017 20:39	WG1053899

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	ND		30.0	1	12/19/2017 09:19	WG1054865

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	12/15/2017 13:28	WG1053330

Sample Narrative:
L957143-02 WG1053330: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	12/19/2017 14:52	WG1053808

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	12/14/2017 00:13	WG1053197

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/13/2017 14:36	WG1053102
Chloride	6.76		1.00	1	12/13/2017 14:36	WG1053102
Fluoride	ND		0.100	1	12/13/2017 14:36	WG1053102
Nitrate	0.504		0.100	1	12/13/2017 14:36	WG1053102
Sulfate	ND		5.00	1	12/13/2017 14:36	WG1053102

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 08:55	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 20:44	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 16:45	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 17:09	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	12/18/2017 21:58	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 19:25	WG1053312
Antimony	ND		0.00200	1	12/18/2017 21:58	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 19:25	WG1053312
Arsenic	ND		0.00200	1	12/18/2017 21:58	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 19:25	WG1053312
Barium	0.00769		0.00500	1	12/18/2017 21:58	WG1053414
Barium,Dissolved	0.00749		0.00500	1	12/19/2017 19:25	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	12/18/2017 21:58	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/19/2017 19:25	WG1053312
Cadmium	ND		0.00100	1	12/18/2017 21:58	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/19/2017 19:25	WG1053312
Calcium	4.31		1.00	1	12/18/2017 21:58	WG1053414
Calcium,Dissolved	4.32		1.00	1	12/19/2017 19:25	WG1053312
Chromium	ND		0.00200	1	12/18/2017 21:58	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 19:25	WG1053312
Cobalt	ND		0.00200	1	12/18/2017 21:58	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 19:25	WG1053312
Copper	ND		0.00500	1	12/18/2017 21:58	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 19:25	WG1053312
Iron	0.178		0.100	1	12/18/2017 21:58	WG1053414
Iron,Dissolved	ND		0.100	1	12/19/2017 19:25	WG1053312
Lead	ND		0.00200	1	12/18/2017 21:58	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 19:25	WG1053312
Magnesium	2.61		1.00	1	12/18/2017 21:58	WG1053414
Magnesium,Dissolved	2.75		1.00	1	12/19/2017 19:25	WG1053312
Manganese	0.0278		0.00500	1	12/18/2017 21:58	WG1053414
Manganese,Dissolved	0.0308		0.00500	1	12/19/2017 19:25	WG1053312
Nickel	ND		0.00200	1	12/18/2017 21:58	WG1053414
Nickel,Dissolved	ND		0.00200	1	12/19/2017 19:25	WG1053312
Potassium	ND		1.00	1	12/18/2017 21:58	WG1053414
Potassium,Dissolved	ND		1.00	1	12/19/2017 19:25	WG1053312
Selenium	ND		0.00200	1	12/18/2017 21:58	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 19:25	WG1053312
Silver	ND		0.00200	1	12/18/2017 21:58	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 19:25	WG1053312
Sodium	3.90		1.00	1	12/18/2017 21:58	WG1053414
Sodium,Dissolved	3.85		1.00	1	12/19/2017 19:25	WG1053312
Thallium	ND		0.00200	1	12/18/2017 21:58	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 19:25	WG1053312
Vanadium	ND		0.00500	1	12/18/2017 21:58	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 19:25	WG1053312
Zinc	ND		0.0250	1	12/18/2017 21:58	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 19:25	WG1053312

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J4	0.0500	1	12/13/2017 21:17	WG1053252
Acrylonitrile	ND		0.0100	1	12/13/2017 21:17	WG1053252
Benzene	ND		0.00100	1	12/13/2017 21:17	WG1053252
Bromochloromethane	ND		0.00100	1	12/13/2017 21:17	WG1053252
Bromodichloromethane	ND		0.00100	1	12/13/2017 21:17	WG1053252
Bromoform	ND		0.00100	1	12/13/2017 21:17	WG1053252
Bromomethane	ND		0.00500	1	12/13/2017 21:17	WG1053252
Carbon disulfide	ND		0.00100	1	12/13/2017 21:17	WG1053252
Carbon tetrachloride	ND		0.00100	1	12/13/2017 21:17	WG1053252
Chlorobenzene	ND		0.00100	1	12/13/2017 21:17	WG1053252
Chlorodibromomethane	ND		0.00100	1	12/13/2017 21:17	WG1053252
Chloroethane	ND		0.00500	1	12/13/2017 21:17	WG1053252
Chloroform	ND		0.00500	1	12/13/2017 21:17	WG1053252
Chloromethane	ND		0.00250	1	12/13/2017 21:17	WG1053252
Dibromomethane	ND		0.00100	1	12/13/2017 21:17	WG1053252
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	12/13/2017 21:17	WG1053252

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	12/13/2017 21:17	WG1053252
1,2-Dichlorobenzene	ND		0.00100	1	12/13/2017 21:17	WG1053252
1,4-Dichlorobenzene	ND		0.00100	1	12/13/2017 21:17	WG1053252
trans-1,4-Dichloro-2-butene	ND		0.00250	1	12/13/2017 21:17	WG1053252
1,1-Dichloroethane	ND		0.00100	1	12/13/2017 21:17	WG1053252
1,2-Dichloroethane	ND		0.00100	1	12/13/2017 21:17	WG1053252
1,1-Dichloroethene	ND		0.00100	1	12/13/2017 21:17	WG1053252
cis-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 21:17	WG1053252
trans-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 21:17	WG1053252
1,2-Dichloropropane	ND		0.00100	1	12/13/2017 21:17	WG1053252
cis-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 21:17	WG1053252
trans-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 21:17	WG1053252
Ethylbenzene	ND		0.00100	1	12/13/2017 21:17	WG1053252
2-Hexanone	ND		0.0100	1	12/13/2017 21:17	WG1053252
Iodomethane	ND		0.0100	1	12/13/2017 21:17	WG1053252
2-Butanone (MEK)	ND		0.0100	1	12/13/2017 21:17	WG1053252
Methylene Chloride	ND		0.00500	1	12/13/2017 21:17	WG1053252
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	12/13/2017 21:17	WG1053252
Styrene	ND		0.00100	1	12/13/2017 21:17	WG1053252
1,1,1,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 21:17	WG1053252
1,1,2,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 21:17	WG1053252
Tetrachloroethene	ND		0.00100	1	12/13/2017 21:17	WG1053252
Toluene	ND		0.00100	1	12/13/2017 21:17	WG1053252
1,1,1-Trichloroethane	ND		0.00100	1	12/13/2017 21:17	WG1053252
1,1,2-Trichloroethane	ND		0.00100	1	12/13/2017 21:17	WG1053252
Trichloroethene	ND		0.00100	1	12/13/2017 21:17	WG1053252
Trichlorofluoromethane	ND		0.00500	1	12/13/2017 21:17	WG1053252
1,2,3-Trichloropropane	ND		0.00250	1	12/13/2017 21:17	WG1053252
Vinyl acetate	ND		0.0100	1	12/13/2017 21:17	WG1053252
Vinyl chloride	ND		0.00100	1	12/13/2017 21:17	WG1053252
Xylenes, Total	ND		0.00300	1	12/13/2017 21:17	WG1053252
(S) Toluene-d8	*102*		*80.0-120*		*12/13/2017 21:17*	WG1053252
(S) Dibromofluoromethane	*104*		*76.0-123*		*12/13/2017 21:17*	WG1053252
(S) a,a,a-Trifluorotoluene	*93.1*		*80.0-120*		*12/13/2017 21:17*	WG1053252
(S) 4-Bromofluorobenzene	*112*		*80.0-120*		*12/13/2017 21:17*	WG1053252

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	12/15/2017 20:51	WG1053899
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	12/15/2017 20:51	WG1053899

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	76.9		30.0	1	12/19/2017 09:21	WG1054865

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	12/15/2017 13:46	WG1053330

Sample Narrative:
L957143-03 WG1053330: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	12/19/2017 14:55	WG1053808

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	12/14/2017 00:14	WG1053197

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/13/2017 15:04	WG1053102
Chloride	52.5		1.00	1	12/13/2017 15:04	WG1053102
Fluoride	ND		0.100	1	12/13/2017 15:04	WG1053102
Nitrate	1.10	T8	0.100	1	12/13/2017 15:04	WG1053102
Sulfate	ND		5.00	1	12/13/2017 15:04	WG1053102

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:08	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 20:55	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 16:48	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 17:13	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.188		0.100	1	12/18/2017 22:10	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 19:40	WG1053312
Antimony	ND		0.00200	1	12/18/2017 22:10	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 19:40	WG1053312
Arsenic	ND		0.00200	1	12/18/2017 22:10	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 19:40	WG1053312
Barium	0.0286		0.00500	1	12/18/2017 22:10	WG1053414
Barium,Dissolved	0.0255		0.00500	1	12/19/2017 19:40	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	12/18/2017 22:10	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 14:02	WG1053312
Cadmium	ND		0.00100	1	12/18/2017 22:10	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/20/2017 14:02	WG1053312
Calcium	12.7		1.00	1	12/18/2017 22:10	WG1053414
Calcium,Dissolved	12.7		1.00	1	12/19/2017 19:40	WG1053312
Chromium	ND		0.00200	1	12/18/2017 22:10	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 19:40	WG1053312
Cobalt	0.00245		0.00200	1	12/18/2017 22:10	WG1053414
Cobalt,Dissolved	0.00223		0.00200	1	12/19/2017 19:40	WG1053312
Copper	ND		0.00500	1	12/18/2017 22:10	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 19:40	WG1053312
Iron	0.500		0.100	1	12/18/2017 22:10	WG1053414
Iron,Dissolved	ND		0.100	1	12/19/2017 19:40	WG1053312
Lead	ND		0.00200	1	12/18/2017 22:10	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 19:40	WG1053312
Magnesium	8.62		1.00	1	12/18/2017 22:10	WG1053414
Magnesium,Dissolved	8.62		1.00	1	12/19/2017 19:40	WG1053312
Manganese	0.0728		0.00500	1	12/18/2017 22:10	WG1053414
Manganese,Dissolved	0.0726		0.00500	1	12/19/2017 19:40	WG1053312
Nickel	0.0211		0.00200	1	12/18/2017 22:10	WG1053414
Nickel,Dissolved	0.0237		0.00200	1	12/19/2017 19:40	WG1053312
Potassium	1.73		1.00	1	12/18/2017 22:10	WG1053414
Potassium,Dissolved	1.19		1.00	1	12/20/2017 14:02	WG1053312
Selenium	ND		0.00200	1	12/18/2017 22:10	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 19:40	WG1053312
Silver	ND		0.00200	1	12/18/2017 22:10	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 19:40	WG1053312
Sodium	14.8		1.00	1	12/18/2017 22:10	WG1053414
Sodium,Dissolved	14.9		1.00	1	12/19/2017 19:40	WG1053312
Thallium	ND		0.00200	1	12/18/2017 22:10	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 19:40	WG1053312
Vanadium	ND		0.00500	1	12/18/2017 22:10	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 19:40	WG1053312
Zinc	ND		0.0250	1	12/18/2017 22:10	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 19:40	WG1053312

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J4	0.0500	1	12/13/2017 21:37	WG1053252
Acrylonitrile	ND		0.0100	1	12/13/2017 21:37	WG1053252
Benzene	ND		0.00100	1	12/13/2017 21:37	WG1053252
Bromochloromethane	ND		0.00100	1	12/13/2017 21:37	WG1053252
Bromodichloromethane	ND		0.00100	1	12/13/2017 21:37	WG1053252
Bromoform	ND		0.00100	1	12/13/2017 21:37	WG1053252
Bromomethane	ND		0.00500	1	12/13/2017 21:37	WG1053252
Carbon disulfide	ND		0.00100	1	12/13/2017 21:37	WG1053252
Carbon tetrachloride	ND		0.00100	1	12/13/2017 21:37	WG1053252
Chlorobenzene	ND		0.00100	1	12/13/2017 21:37	WG1053252
Chlorodibromomethane	ND		0.00100	1	12/13/2017 21:37	WG1053252
Chloroethane	ND		0.00500	1	12/13/2017 21:37	WG1053252
Chloroform	ND		0.00500	1	12/13/2017 21:37	WG1053252
Chloromethane	ND		0.00250	1	12/13/2017 21:37	WG1053252
Dibromomethane	ND		0.00100	1	12/13/2017 21:37	WG1053252
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	12/13/2017 21:37	WG1053252

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	12/13/2017 21:37	WG1053252
1,2-Dichlorobenzene	ND		0.00100	1	12/13/2017 21:37	WG1053252
1,4-Dichlorobenzene	ND		0.00100	1	12/13/2017 21:37	WG1053252
trans-1,4-Dichloro-2-butene	ND		0.00250	1	12/13/2017 21:37	WG1053252
1,1-Dichloroethane	ND		0.00100	1	12/13/2017 21:37	WG1053252
1,2-Dichloroethane	ND		0.00100	1	12/13/2017 21:37	WG1053252
1,1-Dichloroethene	ND		0.00100	1	12/13/2017 21:37	WG1053252
cis-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 21:37	WG1053252
trans-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 21:37	WG1053252
1,2-Dichloropropane	ND		0.00100	1	12/13/2017 21:37	WG1053252
cis-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 21:37	WG1053252
trans-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 21:37	WG1053252
Ethylbenzene	ND		0.00100	1	12/13/2017 21:37	WG1053252
2-Hexanone	ND		0.0100	1	12/13/2017 21:37	WG1053252
Iodomethane	ND		0.0100	1	12/13/2017 21:37	WG1053252
2-Butanone (MEK)	ND		0.0100	1	12/13/2017 21:37	WG1053252
Methylene Chloride	ND		0.00500	1	12/13/2017 21:37	WG1053252
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	12/13/2017 21:37	WG1053252
Styrene	ND		0.00100	1	12/13/2017 21:37	WG1053252
1,1,1,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 21:37	WG1053252
1,1,2,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 21:37	WG1053252
Tetrachloroethene	ND		0.00100	1	12/13/2017 21:37	WG1053252
Toluene	ND		0.00100	1	12/13/2017 21:37	WG1053252
1,1,1-Trichloroethane	ND		0.00100	1	12/13/2017 21:37	WG1053252
1,1,2-Trichloroethane	ND		0.00100	1	12/13/2017 21:37	WG1053252
Trichloroethene	ND		0.00100	1	12/13/2017 21:37	WG1053252
Trichlorofluoromethane	ND		0.00500	1	12/13/2017 21:37	WG1053252
1,2,3-Trichloropropane	ND		0.00250	1	12/13/2017 21:37	WG1053252
Vinyl acetate	ND		0.0100	1	12/13/2017 21:37	WG1053252
Vinyl chloride	ND		0.00100	1	12/13/2017 21:37	WG1053252
Xylenes, Total	ND		0.00300	1	12/13/2017 21:37	WG1053252
(S) Toluene-d8	*97.4*		*80.0-120*		*12/13/2017 21:37*	WG1053252
(S) Dibromofluoromethane	*106*		*76.0-123*		*12/13/2017 21:37*	WG1053252
(S) a,a,a-Trifluorotoluene	*93.0*		*80.0-120*		*12/13/2017 21:37*	WG1053252
(S) 4-Bromofluorobenzene	*111*		*80.0-120*		*12/13/2017 21:37*	WG1053252

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	12/15/2017 21:02	WG1053899
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	12/15/2017 21:02	WG1053899

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	37.8	B	30.0	1	12/19/2017 09:22	WG1054865

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	12/15/2017 13:51	WG1053330

Sample Narrative:
L957143-04 WG1053330: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	12/19/2017 14:57	WG1053808

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	33.8		10.0	1	12/14/2017 00:14	WG1053197

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/13/2017 13:43	WG1053102
Chloride	9.92		1.00	1	12/13/2017 13:43	WG1053102
Fluoride	ND		0.100	1	12/13/2017 13:43	WG1053102
Nitrate	1.41		0.100	1	12/13/2017 13:43	WG1053102
Sulfate	ND		5.00	1	12/13/2017 13:43	WG1053102

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:17	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:04	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 16:50	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 17:23	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	1.15		0.100	1	12/18/2017 22:24	WG1053414
Aluminum,Dissolved	0.128		0.100	1	12/19/2017 19:44	WG1053312
Antimony	ND		0.00200	1	12/18/2017 22:24	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 19:44	WG1053312
Arsenic	0.00329		0.00200	1	12/18/2017 22:24	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 19:44	WG1053312
Barium	0.0259		0.00500	1	12/18/2017 22:24	WG1053414
Barium,Dissolved	0.0116		0.00500	1	12/19/2017 19:44	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	12/18/2017 22:24	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 14:06	WG1053312
Cadmium	ND		0.00100	1	12/18/2017 22:24	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/20/2017 14:06	WG1053312
Calcium	8.07		1.00	1	12/18/2017 22:24	WG1053414
Calcium,Dissolved	7.98		1.00	1	12/19/2017 19:44	WG1053312
Chromium	0.00725		0.00200	1	12/18/2017 22:24	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 19:44	WG1053312
Cobalt	ND		0.00200	1	12/18/2017 22:24	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 19:44	WG1053312
Copper	0.0109		0.00500	1	12/18/2017 22:24	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 19:44	WG1053312
Iron	3.79		0.100	1	12/18/2017 22:24	WG1053414
Iron,Dissolved	0.403		0.100	1	12/19/2017 19:44	WG1053312
Lead	0.00384		0.00200	1	12/18/2017 22:24	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 19:44	WG1053312
Magnesium	2.24		1.00	1	12/18/2017 22:24	WG1053414
Magnesium,Dissolved	2.28		1.00	1	12/19/2017 19:44	WG1053312
Manganese	0.0641		0.00500	1	12/18/2017 22:24	WG1053414
Manganese,Dissolved	0.0206		0.00500	1	12/19/2017 19:44	WG1053312
Nickel	0.00362		0.00200	1	12/18/2017 22:24	WG1053414
Nickel,Dissolved	ND		0.00200	1	12/19/2017 19:44	WG1053312
Potassium	1.13		1.00	1	12/18/2017 22:24	WG1053414
Potassium,Dissolved	ND		1.00	1	12/20/2017 14:06	WG1053312
Selenium	ND		0.00200	1	12/18/2017 22:24	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 19:44	WG1053312
Silver	ND		0.00200	1	12/18/2017 22:24	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 19:44	WG1053312
Sodium	3.23		1.00	1	12/18/2017 22:24	WG1053414
Sodium,Dissolved	3.09		1.00	1	12/19/2017 19:44	WG1053312
Thallium	ND		0.00200	1	12/18/2017 22:24	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 19:44	WG1053312
Vanadium	0.00942		0.00500	1	12/18/2017 22:24	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 19:44	WG1053312
Zinc	ND		0.0250	1	12/18/2017 22:24	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 19:44	WG1053312

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J4	0.0500	1	12/13/2017 21:56	WG1053252
Acrylonitrile	ND		0.0100	1	12/13/2017 21:56	WG1053252
Benzene	ND		0.00100	1	12/13/2017 21:56	WG1053252
Bromochloromethane	ND		0.00100	1	12/13/2017 21:56	WG1053252
Bromodichloromethane	ND		0.00100	1	12/13/2017 21:56	WG1053252
Bromoform	ND		0.00100	1	12/13/2017 21:56	WG1053252
Bromomethane	ND		0.00500	1	12/13/2017 21:56	WG1053252
Carbon disulfide	ND		0.00100	1	12/13/2017 21:56	WG1053252
Carbon tetrachloride	ND		0.00100	1	12/13/2017 21:56	WG1053252
Chlorobenzene	ND		0.00100	1	12/13/2017 21:56	WG1053252
Chlorodibromomethane	ND		0.00100	1	12/13/2017 21:56	WG1053252
Chloroethane	ND		0.00500	1	12/13/2017 21:56	WG1053252
Chloroform	ND		0.00500	1	12/13/2017 21:56	WG1053252
Chloromethane	ND		0.00250	1	12/13/2017 21:56	WG1053252
Dibromomethane	ND		0.00100	1	12/13/2017 21:56	WG1053252
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	12/13/2017 21:56	WG1053252

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	12/13/2017 21:56	WG1053252
1,2-Dichlorobenzene	ND		0.00100	1	12/13/2017 21:56	WG1053252
1,4-Dichlorobenzene	ND		0.00100	1	12/13/2017 21:56	WG1053252
trans-1,4-Dichloro-2-butene	ND		0.00250	1	12/13/2017 21:56	WG1053252
1,1-Dichloroethane	ND		0.00100	1	12/13/2017 21:56	WG1053252
1,2-Dichloroethane	ND		0.00100	1	12/13/2017 21:56	WG1053252
1,1-Dichloroethene	ND		0.00100	1	12/13/2017 21:56	WG1053252
cis-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 21:56	WG1053252
trans-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 21:56	WG1053252
1,2-Dichloropropane	ND		0.00100	1	12/13/2017 21:56	WG1053252
cis-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 21:56	WG1053252
trans-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 21:56	WG1053252
Ethylbenzene	ND		0.00100	1	12/13/2017 21:56	WG1053252
2-Hexanone	ND		0.0100	1	12/13/2017 21:56	WG1053252
Iodomethane	ND		0.0100	1	12/13/2017 21:56	WG1053252
2-Butanone (MEK)	ND		0.0100	1	12/13/2017 21:56	WG1053252
Methylene Chloride	ND		0.00500	1	12/13/2017 21:56	WG1053252
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	12/13/2017 21:56	WG1053252
Styrene	ND		0.00100	1	12/13/2017 21:56	WG1053252
1,1,1,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 21:56	WG1053252
1,1,2,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 21:56	WG1053252
Tetrachloroethene	ND		0.00100	1	12/13/2017 21:56	WG1053252
Toluene	ND		0.00100	1	12/13/2017 21:56	WG1053252
1,1,1-Trichloroethane	ND		0.00100	1	12/13/2017 21:56	WG1053252
1,1,2-Trichloroethane	ND		0.00100	1	12/13/2017 21:56	WG1053252
Trichloroethene	ND		0.00100	1	12/13/2017 21:56	WG1053252
Trichlorofluoromethane	ND		0.00500	1	12/13/2017 21:56	WG1053252
1,2,3-Trichloropropane	ND		0.00250	1	12/13/2017 21:56	WG1053252
Vinyl acetate	ND		0.0100	1	12/13/2017 21:56	WG1053252
Vinyl chloride	ND		0.00100	1	12/13/2017 21:56	WG1053252
Xylenes, Total	ND		0.00300	1	12/13/2017 21:56	WG1053252
(S) Toluene-d8	*103*		*80.0-120*		*12/13/2017 21:56*	WG1053252
(S) Dibromofluoromethane	*102*		*76.0-123*		*12/13/2017 21:56*	WG1053252
(S) a,a,a-Trifluorotoluene	*94.1*		*80.0-120*		*12/13/2017 21:56*	WG1053252
(S) 4-Bromofluorobenzene	*109*		*80.0-120*		*12/13/2017 21:56*	WG1053252

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	12/15/2017 21:13	WG1053899
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	12/15/2017 21:13	WG1053899

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	69.1		30.0	1	12/19/2017 09:23	WG1054865

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	12/15/2017 13:56	WG1053330

Sample Narrative:
L957143-05 WG1053330: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	12/19/2017 14:58	WG1053808

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	74.0		20.0	2	12/14/2017 00:15	WG1053197

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/13/2017 14:09	WG1053102
Chloride	12.4		1.00	1	12/13/2017 14:09	WG1053102
Fluoride	ND		0.100	1	12/13/2017 14:09	WG1053102
Nitrate	0.664		0.100	1	12/13/2017 14:09	WG1053102
Sulfate	ND		5.00	1	12/13/2017 14:09	WG1053102

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:20	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:07	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 16:58	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 17:26	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	28.5		0.100	1	12/18/2017 22:28	WG1053414
Aluminum,Dissolved	0.329		0.100	1	12/19/2017 19:48	WG1053312
Antimony	ND		0.00200	1	12/18/2017 22:28	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 19:48	WG1053312
Arsenic	0.0131		0.00200	1	12/18/2017 22:28	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 19:48	WG1053312
Barium	0.434		0.00500	1	12/18/2017 22:28	WG1053414
Barium,Dissolved	0.0466		0.00500	1	12/19/2017 19:48	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	0.00205		0.00200	1	12/18/2017 22:28	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 14:10	WG1053312
Cadmium	ND		0.00100	1	12/18/2017 22:28	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/20/2017 14:10	WG1053312
Calcium	12.1		1.00	1	12/18/2017 22:28	WG1053414
Calcium,Dissolved	7.02		1.00	1	12/19/2017 19:48	WG1053312
Chromium	0.0367		0.00200	1	12/18/2017 22:28	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 19:48	WG1053312
Cobalt	0.00755		0.00200	1	12/18/2017 22:28	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 19:48	WG1053312
Copper	0.0241		0.00500	1	12/18/2017 22:28	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 19:48	WG1053312
Iron	39.3		0.100	1	12/18/2017 22:28	WG1053414
Iron,Dissolved	0.174		0.100	1	12/19/2017 19:48	WG1053312
Lead	0.0305		0.00200	1	12/18/2017 22:28	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 19:48	WG1053312
Magnesium	6.62		1.00	1	12/18/2017 22:28	WG1053414
Magnesium,Dissolved	2.69		1.00	1	12/19/2017 19:48	WG1053312
Manganese	0.312		0.00500	1	12/18/2017 22:28	WG1053414
Manganese,Dissolved	0.00688	B	0.00500	1	12/19/2017 19:48	WG1053312
Nickel	0.0189		0.00200	1	12/18/2017 22:28	WG1053414
Nickel,Dissolved	ND		0.00200	1	12/19/2017 19:48	WG1053312
Potassium	2.52		1.00	1	12/18/2017 22:28	WG1053414
Potassium,Dissolved	ND		1.00	1	12/20/2017 14:10	WG1053312
Selenium	ND		0.00200	1	12/18/2017 22:28	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 19:48	WG1053312
Silver	ND		0.00200	1	12/18/2017 22:28	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 19:48	WG1053312
Sodium	3.41		1.00	1	12/18/2017 22:28	WG1053414
Sodium,Dissolved	3.27		1.00	1	12/19/2017 19:48	WG1053312
Thallium	ND		0.00200	1	12/18/2017 22:28	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 19:48	WG1053312
Vanadium	0.0747		0.00500	1	12/18/2017 22:28	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 19:48	WG1053312
Zinc	0.0930		0.0250	1	12/18/2017 22:28	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 19:48	WG1053312

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J4	0.0500	1	12/13/2017 22:16	WG1053252
Acrylonitrile	ND		0.0100	1	12/13/2017 22:16	WG1053252
Benzene	ND		0.00100	1	12/13/2017 22:16	WG1053252
Bromochloromethane	ND		0.00100	1	12/13/2017 22:16	WG1053252
Bromodichloromethane	ND		0.00100	1	12/13/2017 22:16	WG1053252
Bromoform	ND		0.00100	1	12/13/2017 22:16	WG1053252
Bromomethane	ND		0.00500	1	12/13/2017 22:16	WG1053252
Carbon disulfide	ND		0.00100	1	12/13/2017 22:16	WG1053252
Carbon tetrachloride	ND		0.00100	1	12/13/2017 22:16	WG1053252
Chlorobenzene	ND		0.00100	1	12/13/2017 22:16	WG1053252
Chlorodibromomethane	ND		0.00100	1	12/13/2017 22:16	WG1053252
Chloroethane	ND		0.00500	1	12/13/2017 22:16	WG1053252
Chloroform	ND		0.00500	1	12/13/2017 22:16	WG1053252
Chloromethane	ND		0.00250	1	12/13/2017 22:16	WG1053252
Dibromomethane	ND		0.00100	1	12/13/2017 22:16	WG1053252
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	12/13/2017 22:16	WG1053252

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	12/13/2017 22:16	WG1053252
1,2-Dichlorobenzene	ND		0.00100	1	12/13/2017 22:16	WG1053252
1,4-Dichlorobenzene	ND		0.00100	1	12/13/2017 22:16	WG1053252
trans-1,4-Dichloro-2-butene	ND		0.00250	1	12/13/2017 22:16	WG1053252
1,1-Dichloroethane	ND		0.00100	1	12/13/2017 22:16	WG1053252
1,2-Dichloroethane	ND		0.00100	1	12/13/2017 22:16	WG1053252
1,1-Dichloroethene	ND		0.00100	1	12/13/2017 22:16	WG1053252
cis-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 22:16	WG1053252
trans-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 22:16	WG1053252
1,2-Dichloropropane	ND		0.00100	1	12/13/2017 22:16	WG1053252
cis-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 22:16	WG1053252
trans-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 22:16	WG1053252
Ethylbenzene	ND		0.00100	1	12/13/2017 22:16	WG1053252
2-Hexanone	ND		0.0100	1	12/13/2017 22:16	WG1053252
Iodomethane	ND		0.0100	1	12/13/2017 22:16	WG1053252
2-Butanone (MEK)	ND		0.0100	1	12/13/2017 22:16	WG1053252
Methylene Chloride	ND		0.00500	1	12/13/2017 22:16	WG1053252
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	12/13/2017 22:16	WG1053252
Styrene	ND		0.00100	1	12/13/2017 22:16	WG1053252
1,1,1,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 22:16	WG1053252
1,1,2,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 22:16	WG1053252
Tetrachloroethene	ND		0.00100	1	12/13/2017 22:16	WG1053252
Toluene	ND		0.00100	1	12/13/2017 22:16	WG1053252
1,1,1-Trichloroethane	ND		0.00100	1	12/13/2017 22:16	WG1053252
1,1,2-Trichloroethane	ND		0.00100	1	12/13/2017 22:16	WG1053252
Trichloroethene	ND		0.00100	1	12/13/2017 22:16	WG1053252
Trichlorofluoromethane	ND		0.00500	1	12/13/2017 22:16	WG1053252
1,2,3-Trichloropropane	ND		0.00250	1	12/13/2017 22:16	WG1053252
Vinyl acetate	ND		0.0100	1	12/13/2017 22:16	WG1053252
Vinyl chloride	ND		0.00100	1	12/13/2017 22:16	WG1053252
Xylenes, Total	ND		0.00300	1	12/13/2017 22:16	WG1053252
(S) Toluene-d8	*96.1*		*80.0-120*		*12/13/2017 22:16*	WG1053252
(S) Dibromofluoromethane	*110*		*76.0-123*		*12/13/2017 22:16*	WG1053252
(S) a,a,a-Trifluorotoluene	*98.2*		*80.0-120*		*12/13/2017 22:16*	WG1053252
(S) 4-Bromofluorobenzene	*115*		*80.0-120*		*12/13/2017 22:16*	WG1053252

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	12/15/2017 21:25	WG1053899
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	12/15/2017 21:25	WG1053899

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	71.4		30.0	1	12/19/2017 09:24	WG1054865

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	12/15/2017 14:02	WG1053330

Sample Narrative:
L957143-06 WG1053330: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	12/19/2017 15:00	WG1053808

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	12/14/2017 00:15	WG1053197

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/13/2017 14:23	WG1053102
Chloride	43.6		1.00	1	12/13/2017 14:23	WG1053102
Fluoride	ND		0.100	1	12/13/2017 14:23	WG1053102
Nitrate	3.43		0.100	1	12/13/2017 14:23	WG1053102
Sulfate	ND		5.00	1	12/13/2017 14:23	WG1053102

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:22	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:09	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 17:01	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 17:29	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.275		0.100	1	12/18/2017 22:32	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 19:52	WG1053312
Antimony	ND		0.00200	1	12/18/2017 22:32	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 19:52	WG1053312
Arsenic	ND		0.00200	1	12/18/2017 22:32	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 19:52	WG1053312
Barium	0.0361		0.00500	1	12/18/2017 22:32	WG1053414
Barium,Dissolved	0.0341		0.00500	1	12/19/2017 19:52	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	12/18/2017 22:32	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 14:14	WG1053312
Cadmium	ND		0.00100	1	12/18/2017 22:32	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/20/2017 14:14	WG1053312
Calcium	16.5		1.00	1	12/18/2017 22:32	WG1053414
Calcium,Dissolved	16.6		1.00	1	12/19/2017 19:52	WG1053312
Chromium	ND		0.00200	1	12/18/2017 22:32	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 19:52	WG1053312
Cobalt	ND		0.00200	1	12/18/2017 22:32	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 19:52	WG1053312
Copper	ND		0.00500	1	12/18/2017 22:32	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 19:52	WG1053312
Iron	1.35		0.100	1	12/18/2017 22:32	WG1053414
Iron,Dissolved	ND		0.100	1	12/19/2017 19:52	WG1053312
Lead	ND		0.00200	1	12/18/2017 22:32	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 19:52	WG1053312
Magnesium	5.41		1.00	1	12/18/2017 22:32	WG1053414
Magnesium,Dissolved	5.43		1.00	1	12/19/2017 19:52	WG1053312
Manganese	0.0233		0.00500	1	12/18/2017 22:32	WG1053414
Manganese,Dissolved	0.0152		0.00500	1	12/19/2017 19:52	WG1053312
Nickel	0.00202		0.00200	1	12/18/2017 22:32	WG1053414
Nickel,Dissolved	ND		0.00200	1	12/19/2017 19:52	WG1053312
Potassium	1.53		1.00	1	12/18/2017 22:32	WG1053414
Potassium,Dissolved	1.51		1.00	1	12/20/2017 14:14	WG1053312
Selenium	ND		0.00200	1	12/18/2017 22:32	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 19:52	WG1053312
Silver	ND		0.00200	1	12/18/2017 22:32	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 19:52	WG1053312
Sodium	8.61		1.00	1	12/18/2017 22:32	WG1053414
Sodium,Dissolved	8.82		1.00	1	12/19/2017 19:52	WG1053312
Thallium	ND		0.00200	1	12/18/2017 22:32	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 19:52	WG1053312
Vanadium	ND		0.00500	1	12/18/2017 22:32	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 19:52	WG1053312
Zinc	ND		0.0250	1	12/18/2017 22:32	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 19:52	WG1053312

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J4	0.0500	1	12/13/2017 22:35	WG1053252
Acrylonitrile	ND		0.0100	1	12/13/2017 22:35	WG1053252
Benzene	ND		0.00100	1	12/13/2017 22:35	WG1053252
Bromochloromethane	ND		0.00100	1	12/13/2017 22:35	WG1053252
Bromodichloromethane	ND		0.00100	1	12/13/2017 22:35	WG1053252
Bromoform	ND		0.00100	1	12/13/2017 22:35	WG1053252
Bromomethane	ND		0.00500	1	12/13/2017 22:35	WG1053252
Carbon disulfide	ND		0.00100	1	12/13/2017 22:35	WG1053252
Carbon tetrachloride	ND		0.00100	1	12/13/2017 22:35	WG1053252
Chlorobenzene	ND		0.00100	1	12/13/2017 22:35	WG1053252
Chlorodibromomethane	ND		0.00100	1	12/13/2017 22:35	WG1053252
Chloroethane	ND		0.00500	1	12/13/2017 22:35	WG1053252
Chloroform	ND		0.00500	1	12/13/2017 22:35	WG1053252
Chloromethane	ND		0.00250	1	12/13/2017 22:35	WG1053252
Dibromomethane	ND		0.00100	1	12/13/2017 22:35	WG1053252
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	12/13/2017 22:35	WG1053252

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	12/13/2017 22:35	WG1053252
1,2-Dichlorobenzene	ND		0.00100	1	12/13/2017 22:35	WG1053252
1,4-Dichlorobenzene	ND		0.00100	1	12/13/2017 22:35	WG1053252
trans-1,4-Dichloro-2-butene	ND		0.00250	1	12/13/2017 22:35	WG1053252
1,1-Dichloroethane	ND		0.00100	1	12/13/2017 22:35	WG1053252
1,2-Dichloroethane	ND		0.00100	1	12/13/2017 22:35	WG1053252
1,1-Dichloroethene	ND		0.00100	1	12/13/2017 22:35	WG1053252
cis-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 22:35	WG1053252
trans-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 22:35	WG1053252
1,2-Dichloropropane	ND		0.00100	1	12/13/2017 22:35	WG1053252
cis-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 22:35	WG1053252
trans-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 22:35	WG1053252
Ethylbenzene	ND		0.00100	1	12/13/2017 22:35	WG1053252
2-Hexanone	ND		0.0100	1	12/13/2017 22:35	WG1053252
Iodomethane	ND		0.0100	1	12/13/2017 22:35	WG1053252
2-Butanone (MEK)	ND		0.0100	1	12/13/2017 22:35	WG1053252
Methylene Chloride	ND		0.00500	1	12/13/2017 22:35	WG1053252
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	12/13/2017 22:35	WG1053252
Styrene	ND		0.00100	1	12/13/2017 22:35	WG1053252
1,1,1,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 22:35	WG1053252
1,1,2,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 22:35	WG1053252
Tetrachloroethene	ND		0.00100	1	12/13/2017 22:35	WG1053252
Toluene	ND		0.00100	1	12/13/2017 22:35	WG1053252
1,1,1-Trichloroethane	ND		0.00100	1	12/13/2017 22:35	WG1053252
1,1,2-Trichloroethane	ND		0.00100	1	12/13/2017 22:35	WG1053252
Trichloroethene	ND		0.00100	1	12/13/2017 22:35	WG1053252
Trichlorofluoromethane	ND		0.00500	1	12/13/2017 22:35	WG1053252
1,2,3-Trichloropropane	ND		0.00250	1	12/13/2017 22:35	WG1053252
Vinyl acetate	ND		0.0100	1	12/13/2017 22:35	WG1053252
Vinyl chloride	ND		0.00100	1	12/13/2017 22:35	WG1053252
Xylenes, Total	ND		0.00300	1	12/13/2017 22:35	WG1053252
(S) Toluene-d8	*97.4*		*80.0-120*		*12/13/2017 22:35*	WG1053252
(S) Dibromofluoromethane	*108*		*76.0-123*		*12/13/2017 22:35*	WG1053252
(S) a,a,a-Trifluorotoluene	*94.6*		*80.0-120*		*12/13/2017 22:35*	WG1053252
(S) 4-Bromofluorobenzene	*110*		*80.0-120*		*12/13/2017 22:35*	WG1053252

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	12/15/2017 21:36	WG1053899
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	12/15/2017 21:36	WG1053899

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	ND		30.0	1	12/19/2017 09:25	WG1054865

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	12/15/2017 14:07	WG1053330

Sample Narrative:
L957143-07 WG1053330: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	12/19/2017 15:01	WG1053808

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	12/14/2017 00:15	WG1053197

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/13/2017 16:12	WG1053102
Chloride	6.65		1.00	1	12/13/2017 16:12	WG1053102
Fluoride	ND		0.100	1	12/13/2017 16:12	WG1053102
Nitrate	0.441	T8	0.100	1	12/13/2017 16:12	WG1053102
Sulfate	ND		5.00	1	12/13/2017 16:12	WG1053102

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:24	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:11	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 17:04	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 17:33	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	12/18/2017 22:36	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 19:55	WG1053312
Antimony	ND		0.00200	1	12/18/2017 22:36	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 19:55	WG1053312
Arsenic	ND		0.00200	1	12/18/2017 22:36	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 19:55	WG1053312
Barium	0.00775		0.00500	1	12/18/2017 22:36	WG1053414
Barium,Dissolved	0.00762		0.00500	1	12/19/2017 19:55	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	12/18/2017 22:36	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 14:18	WG1053312
Cadmium	ND		0.00100	1	12/18/2017 22:36	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/20/2017 14:18	WG1053312
Calcium	4.37		1.00	1	12/18/2017 22:36	WG1053414
Calcium,Dissolved	4.30		1.00	1	12/19/2017 19:55	WG1053312
Chromium	ND		0.00200	1	12/18/2017 22:36	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 19:55	WG1053312
Cobalt	ND		0.00200	1	12/18/2017 22:36	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 19:55	WG1053312
Copper	ND		0.00500	1	12/18/2017 22:36	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 19:55	WG1053312
Iron	0.247		0.100	1	12/18/2017 22:36	WG1053414
Iron,Dissolved	ND		0.100	1	12/19/2017 19:55	WG1053312
Lead	ND		0.00200	1	12/18/2017 22:36	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 19:55	WG1053312
Magnesium	2.62		1.00	1	12/18/2017 22:36	WG1053414
Magnesium,Dissolved	2.73		1.00	1	12/19/2017 19:55	WG1053312
Manganese	0.0287		0.00500	1	12/18/2017 22:36	WG1053414
Manganese,Dissolved	0.0270		0.00500	1	12/19/2017 19:55	WG1053312
Nickel	ND		0.00200	1	12/18/2017 22:36	WG1053414
Nickel,Dissolved	ND		0.00200	1	12/19/2017 19:55	WG1053312
Potassium	ND		1.00	1	12/18/2017 22:36	WG1053414
Potassium,Dissolved	ND		1.00	1	12/20/2017 14:18	WG1053312
Selenium	ND		0.00200	1	12/18/2017 22:36	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 19:55	WG1053312
Silver	ND		0.00200	1	12/18/2017 22:36	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 19:55	WG1053312
Sodium	3.87		1.00	1	12/18/2017 22:36	WG1053414
Sodium,Dissolved	3.83		1.00	1	12/19/2017 19:55	WG1053312
Thallium	ND		0.00200	1	12/18/2017 22:36	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 19:55	WG1053312
Vanadium	ND		0.00500	1	12/18/2017 22:36	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 19:55	WG1053312
Zinc	ND		0.0250	1	12/18/2017 22:36	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 19:55	WG1053312

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J4	0.0500	1	12/13/2017 22:54	WG1053252
Acrylonitrile	ND		0.0100	1	12/13/2017 22:54	WG1053252
Benzene	ND		0.00100	1	12/13/2017 22:54	WG1053252
Bromochloromethane	ND		0.00100	1	12/13/2017 22:54	WG1053252
Bromodichloromethane	ND		0.00100	1	12/13/2017 22:54	WG1053252
Bromoform	ND		0.00100	1	12/13/2017 22:54	WG1053252
Bromomethane	ND		0.00500	1	12/13/2017 22:54	WG1053252
Carbon disulfide	ND		0.00100	1	12/13/2017 22:54	WG1053252
Carbon tetrachloride	ND		0.00100	1	12/13/2017 22:54	WG1053252
Chlorobenzene	ND		0.00100	1	12/13/2017 22:54	WG1053252
Chlorodibromomethane	ND		0.00100	1	12/13/2017 22:54	WG1053252
Chloroethane	ND		0.00500	1	12/13/2017 22:54	WG1053252
Chloroform	ND		0.00500	1	12/13/2017 22:54	WG1053252
Chloromethane	ND		0.00250	1	12/13/2017 22:54	WG1053252
Dibromomethane	ND		0.00100	1	12/13/2017 22:54	WG1053252
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	12/13/2017 22:54	WG1053252

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	12/13/2017 22:54	WG1053252
1,2-Dichlorobenzene	ND		0.00100	1	12/13/2017 22:54	WG1053252
1,4-Dichlorobenzene	ND		0.00100	1	12/13/2017 22:54	WG1053252
trans-1,4-Dichloro-2-butene	ND		0.00250	1	12/13/2017 22:54	WG1053252
1,1-Dichloroethane	ND		0.00100	1	12/13/2017 22:54	WG1053252
1,2-Dichloroethane	ND		0.00100	1	12/13/2017 22:54	WG1053252
1,1-Dichloroethene	ND		0.00100	1	12/13/2017 22:54	WG1053252
cis-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 22:54	WG1053252
trans-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 22:54	WG1053252
1,2-Dichloropropane	ND		0.00100	1	12/13/2017 22:54	WG1053252
cis-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 22:54	WG1053252
trans-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 22:54	WG1053252
Ethylbenzene	ND		0.00100	1	12/13/2017 22:54	WG1053252
2-Hexanone	ND		0.0100	1	12/13/2017 22:54	WG1053252
Iodomethane	ND		0.0100	1	12/13/2017 22:54	WG1053252
2-Butanone (MEK)	ND		0.0100	1	12/13/2017 22:54	WG1053252
Methylene Chloride	ND		0.00500	1	12/13/2017 22:54	WG1053252
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	12/13/2017 22:54	WG1053252
Styrene	ND		0.00100	1	12/13/2017 22:54	WG1053252
1,1,1,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 22:54	WG1053252
1,1,2,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 22:54	WG1053252
Tetrachloroethene	ND		0.00100	1	12/13/2017 22:54	WG1053252
Toluene	ND		0.00100	1	12/13/2017 22:54	WG1053252
1,1,1-Trichloroethane	ND		0.00100	1	12/13/2017 22:54	WG1053252
1,1,2-Trichloroethane	ND		0.00100	1	12/13/2017 22:54	WG1053252
Trichloroethene	ND		0.00100	1	12/13/2017 22:54	WG1053252
Trichlorofluoromethane	ND		0.00500	1	12/13/2017 22:54	WG1053252
1,2,3-Trichloropropane	ND		0.00250	1	12/13/2017 22:54	WG1053252
Vinyl acetate	ND		0.0100	1	12/13/2017 22:54	WG1053252
Vinyl chloride	ND		0.00100	1	12/13/2017 22:54	WG1053252
Xylenes, Total	ND		0.00300	1	12/13/2017 22:54	WG1053252
(S) Toluene-d8	*105*		*80.0-120*		*12/13/2017 22:54*	WG1053252
(S) Dibromofluoromethane	*110*		*76.0-123*		*12/13/2017 22:54*	WG1053252
(S) a,a,a-Trifluorotoluene	*97.0*		*80.0-120*		*12/13/2017 22:54*	WG1053252
(S) 4-Bromofluorobenzene	*112*		*80.0-120*		*12/13/2017 22:54*	WG1053252

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	12/15/2017 21:48	WG1053899
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	12/15/2017 21:48	WG1053899

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	ND		30.0	1	12/19/2017 09:25	WG1054865

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	12/15/2017 14:12	WG1053330

Sample Narrative:
L957143-08 WG1053330: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	12/19/2017 15:03	WG1053808

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	12/14/2017 00:15	WG1053197

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/13/2017 13:56	WG1053102
Chloride	ND		1.00	1	12/13/2017 13:56	WG1053102
Fluoride	ND		0.100	1	12/13/2017 13:56	WG1053102
Nitrate	ND		0.100	1	12/13/2017 13:56	WG1053102
Sulfate	ND		5.00	1	12/13/2017 13:56	WG1053102

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:26	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:14	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 17:06	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 17:36	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	12/18/2017 22:40	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 19:59	WG1053312
Antimony	ND		0.00200	1	12/18/2017 22:40	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 19:59	WG1053312
Arsenic	ND		0.00200	1	12/18/2017 22:40	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 19:59	WG1053312
Barium	ND		0.00500	1	12/18/2017 22:40	WG1053414
Barium,Dissolved	ND		0.00500	1	12/19/2017 19:59	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.00200	1	12/18/2017 22:40	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 14:22	WG1053312
Cadmium	ND		0.00100	1	12/18/2017 22:40	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/20/2017 14:22	WG1053312
Calcium	ND		1.00	1	12/18/2017 22:40	WG1053414
Calcium,Dissolved	ND		1.00	1	12/19/2017 19:59	WG1053312
Chromium	ND		0.00200	1	12/18/2017 22:40	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 19:59	WG1053312
Cobalt	ND		0.00200	1	12/18/2017 22:40	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 19:59	WG1053312
Copper	ND		0.00500	1	12/18/2017 22:40	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 19:59	WG1053312
Iron	ND		0.100	1	12/18/2017 22:40	WG1053414
Iron,Dissolved	ND		0.100	1	12/19/2017 19:59	WG1053312
Lead	ND		0.00200	1	12/18/2017 22:40	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 19:59	WG1053312
Magnesium	ND		1.00	1	12/18/2017 22:40	WG1053414
Magnesium,Dissolved	ND		1.00	1	12/19/2017 19:59	WG1053312
Manganese	ND		0.00500	1	12/18/2017 22:40	WG1053414
Manganese,Dissolved	ND		0.00500	1	12/19/2017 19:59	WG1053312
Nickel	ND		0.00200	1	12/18/2017 22:40	WG1053414
Nickel,Dissolved	ND		0.00200	1	12/19/2017 19:59	WG1053312
Potassium	ND		1.00	1	12/18/2017 22:40	WG1053414
Potassium,Dissolved	ND		1.00	1	12/20/2017 14:22	WG1053312
Selenium	ND		0.00200	1	12/18/2017 22:40	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 19:59	WG1053312
Silver	ND		0.00200	1	12/18/2017 22:40	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 19:59	WG1053312
Sodium	ND		1.00	1	12/18/2017 22:40	WG1053414
Sodium,Dissolved	ND		1.00	1	12/19/2017 19:59	WG1053312
Thallium	ND		0.00200	1	12/18/2017 22:40	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 19:59	WG1053312
Vanadium	ND		0.00500	1	12/18/2017 22:40	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 19:59	WG1053312
Zinc	ND		0.0250	1	12/18/2017 22:40	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 19:59	WG1053312

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J4	0.0500	1	12/13/2017 23:14	WG1053252
Acrylonitrile	ND		0.0100	1	12/13/2017 23:14	WG1053252
Benzene	ND		0.00100	1	12/13/2017 23:14	WG1053252
Bromochloromethane	ND		0.00100	1	12/13/2017 23:14	WG1053252
Bromodichloromethane	ND		0.00100	1	12/13/2017 23:14	WG1053252
Bromoform	ND		0.00100	1	12/13/2017 23:14	WG1053252
Bromomethane	ND		0.00500	1	12/13/2017 23:14	WG1053252
Carbon disulfide	ND		0.00100	1	12/13/2017 23:14	WG1053252
Carbon tetrachloride	ND		0.00100	1	12/13/2017 23:14	WG1053252
Chlorobenzene	ND		0.00100	1	12/13/2017 23:14	WG1053252
Chlorodibromomethane	ND		0.00100	1	12/13/2017 23:14	WG1053252
Chloroethane	ND		0.00500	1	12/13/2017 23:14	WG1053252
Chloroform	ND		0.00500	1	12/13/2017 23:14	WG1053252
Chloromethane	ND		0.00250	1	12/13/2017 23:14	WG1053252
Dibromomethane	ND		0.00100	1	12/13/2017 23:14	WG1053252
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	12/13/2017 23:14	WG1053252

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	12/13/2017 23:14	WG1053252
1,2-Dichlorobenzene	ND		0.00100	1	12/13/2017 23:14	WG1053252
1,4-Dichlorobenzene	ND		0.00100	1	12/13/2017 23:14	WG1053252
trans-1,4-Dichloro-2-butene	ND		0.00250	1	12/13/2017 23:14	WG1053252
1,1-Dichloroethane	ND		0.00100	1	12/13/2017 23:14	WG1053252
1,2-Dichloroethane	ND		0.00100	1	12/13/2017 23:14	WG1053252
1,1-Dichloroethene	ND		0.00100	1	12/13/2017 23:14	WG1053252
cis-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 23:14	WG1053252
trans-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 23:14	WG1053252
1,2-Dichloropropane	ND		0.00100	1	12/13/2017 23:14	WG1053252
cis-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 23:14	WG1053252
trans-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 23:14	WG1053252
Ethylbenzene	ND		0.00100	1	12/13/2017 23:14	WG1053252
2-Hexanone	ND		0.0100	1	12/13/2017 23:14	WG1053252
Iodomethane	ND		0.0100	1	12/13/2017 23:14	WG1053252
2-Butanone (MEK)	ND		0.0100	1	12/13/2017 23:14	WG1053252
Methylene Chloride	ND		0.00500	1	12/13/2017 23:14	WG1053252
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	12/13/2017 23:14	WG1053252
Styrene	ND		0.00100	1	12/13/2017 23:14	WG1053252
1,1,1,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 23:14	WG1053252
1,1,2,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 23:14	WG1053252
Tetrachloroethene	ND		0.00100	1	12/13/2017 23:14	WG1053252
Toluene	ND		0.00100	1	12/13/2017 23:14	WG1053252
1,1,1-Trichloroethane	ND		0.00100	1	12/13/2017 23:14	WG1053252
1,1,2-Trichloroethane	ND		0.00100	1	12/13/2017 23:14	WG1053252
Trichloroethene	ND		0.00100	1	12/13/2017 23:14	WG1053252
Trichlorofluoromethane	ND		0.00500	1	12/13/2017 23:14	WG1053252
1,2,3-Trichloropropane	ND		0.00250	1	12/13/2017 23:14	WG1053252
Vinyl acetate	ND		0.0100	1	12/13/2017 23:14	WG1053252
Vinyl chloride	ND		0.00100	1	12/13/2017 23:14	WG1053252
Xylenes, Total	ND		0.00300	1	12/13/2017 23:14	WG1053252
(S) Toluene-d8	*97.8*		*80.0-120*		*12/13/2017 23:14*	WG1053252
(S) Dibromofluoromethane	*110*		*76.0-123*		*12/13/2017 23:14*	WG1053252
(S) a,a,a-Trifluorotoluene	*94.7*		*80.0-120*		*12/13/2017 23:14*	WG1053252
(S) 4-Bromofluorobenzene	*107*		*80.0-120*		*12/13/2017 23:14*	WG1053252

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	12/15/2017 21:59	WG1053899
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	12/15/2017 21:59	WG1053899

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J4	0.0500	1	12/13/2017 20:38	WG1053252
Acrylonitrile	ND		0.0100	1	12/13/2017 20:38	WG1053252
Benzene	ND		0.00100	1	12/13/2017 20:38	WG1053252
Bromochloromethane	ND		0.00100	1	12/13/2017 20:38	WG1053252
Bromodichloromethane	ND		0.00100	1	12/13/2017 20:38	WG1053252
Bromoform	ND		0.00100	1	12/13/2017 20:38	WG1053252
Bromomethane	ND		0.00500	1	12/13/2017 20:38	WG1053252
Carbon disulfide	ND		0.00100	1	12/13/2017 20:38	WG1053252
Carbon tetrachloride	ND		0.00100	1	12/13/2017 20:38	WG1053252
Chlorobenzene	ND		0.00100	1	12/13/2017 20:38	WG1053252
Chlorodibromomethane	ND		0.00100	1	12/13/2017 20:38	WG1053252
Chloroethane	ND		0.00500	1	12/13/2017 20:38	WG1053252
Chloroform	ND		0.00500	1	12/13/2017 20:38	WG1053252
Chloromethane	ND		0.00250	1	12/13/2017 20:38	WG1053252
Dibromomethane	ND		0.00100	1	12/13/2017 20:38	WG1053252
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	12/13/2017 20:38	WG1053252
1,2-Dibromoethane	ND		0.00100	1	12/13/2017 20:38	WG1053252
1,2-Dichlorobenzene	ND		0.00100	1	12/13/2017 20:38	WG1053252
1,4-Dichlorobenzene	ND		0.00100	1	12/13/2017 20:38	WG1053252
trans-1,4-Dichloro-2-butene	ND		0.00250	1	12/13/2017 20:38	WG1053252
1,1-Dichloroethane	ND		0.00100	1	12/13/2017 20:38	WG1053252
1,2-Dichloroethane	ND		0.00100	1	12/13/2017 20:38	WG1053252
1,1-Dichloroethene	ND		0.00100	1	12/13/2017 20:38	WG1053252
cis-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 20:38	WG1053252
trans-1,2-Dichloroethene	ND		0.00100	1	12/13/2017 20:38	WG1053252
1,2-Dichloropropane	ND		0.00100	1	12/13/2017 20:38	WG1053252
cis-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 20:38	WG1053252
trans-1,3-Dichloropropene	ND		0.00100	1	12/13/2017 20:38	WG1053252
Ethylbenzene	ND		0.00100	1	12/13/2017 20:38	WG1053252
2-Hexanone	ND		0.0100	1	12/13/2017 20:38	WG1053252
Iodomethane	ND		0.0100	1	12/13/2017 20:38	WG1053252
2-Butanone (MEK)	ND		0.0100	1	12/13/2017 20:38	WG1053252
Methylene Chloride	ND		0.00500	1	12/13/2017 20:38	WG1053252
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	12/13/2017 20:38	WG1053252
Styrene	ND		0.00100	1	12/13/2017 20:38	WG1053252
1,1,1,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 20:38	WG1053252
1,1,2,2-Tetrachloroethane	ND		0.00100	1	12/13/2017 20:38	WG1053252
Tetrachloroethene	ND		0.00100	1	12/13/2017 20:38	WG1053252
Toluene	ND		0.00100	1	12/13/2017 20:38	WG1053252
1,1,1-Trichloroethane	ND		0.00100	1	12/13/2017 20:38	WG1053252
1,1,2-Trichloroethane	ND		0.00100	1	12/13/2017 20:38	WG1053252
Trichloroethene	ND		0.00100	1	12/13/2017 20:38	WG1053252
Trichlorofluoromethane	ND		0.00500	1	12/13/2017 20:38	WG1053252
1,2,3-Trichloropropane	ND		0.00250	1	12/13/2017 20:38	WG1053252
Vinyl acetate	ND		0.0100	1	12/13/2017 20:38	WG1053252
Vinyl chloride	ND		0.00100	1	12/13/2017 20:38	WG1053252
Xylenes, Total	ND		0.00300	1	12/13/2017 20:38	WG1053252
(S) Toluene-d8	*102*		*80.0-120*		*12/13/2017 20:38*	WG1053252
(S) Dibromofluoromethane	*107*		*76.0-123*		*12/13/2017 20:38*	WG1053252
(S) a,a,a-Trifluorotoluene	*96.9*		*80.0-120*		*12/13/2017 20:38*	WG1053252
(S) 4-Bromofluorobenzene	*113*		*80.0-120*		*12/13/2017 20:38*	WG1053252

Method Blank (MB)

(MB) R3274059-1 12/19/17 09:11

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	3.84	J	1.43	30.0

L957175-05 Original Sample (OS) • Duplicate (DUP)

(OS) L957175-05 12/19/17 09:38 • (DUP) R3274059-5 12/19/17 09:38

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	80.5	78.8	1	2.13		20

L957143-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957143-01 12/19/17 09:17 • (DUP) R3274059-4 12/19/17 09:18

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	ND	24.9	1	3.16	J	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274059-2 12/19/17 09:12 • (LCSD) R3274059-3 12/19/17 09:13

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	159	158	106	105	85-115			0.631	20

L957143-02 Original Sample (OS) • Duplicate (DUP)

(OS) L957143-02 12/15/17 13:28 • (DUP) R3273863-7 12/15/17 13:35

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Alkalinity	ND	18.0	1	0.373	J	20

Sample Narrative:

OS: Endpoint pH 4.5

DUP: Endpoint pH 4.5

L957683-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957683-01 12/15/17 15:11 • (DUP) R3273863-10 12/15/17 15:25

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Alkalinity	33.3	64.3	1	63.7	P1	20

Sample Narrative:

OS: Endpoint pH 4.5

DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273863-1 12/15/17 13:01 • (LCSD) R3273863-9 12/15/17 14:26

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Alkalinity	100	107	91.9	107	91.9	85.0-115			14.9	20

Sample Narrative:

LCS: Endpoint pH 4.5

LCSD: Endpoint pH 4.5

Method Blank (MB)

(MB) R3274211-1 12/19/17 13:39

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ammonia Nitrogen	U		0.0317	0.100

L957143-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957143-01 12/19/17 13:51 • (DUP) R3274211-4 12/19/17 13:53

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	0.103	0.212	1	69.2	P1	10

L957175-04 Original Sample (OS) • Duplicate (DUP)

(OS) L957175-04 12/19/17 16:03 • (DUP) R3274211-9 12/19/17 16:04

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.000	1	0		10

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274211-2 12/19/17 13:40 • (LCSD) R3274211-3 12/19/17 13:42

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	7.50	7.20	7.27	96	97	90-110			0.995	20

L957143-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L957143-02 12/19/17 14:52 • (MS) R3274211-5 12/19/17 14:53

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	5.00	ND	5.17	103	1	90-110	

L957175-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957175-05 12/19/17 15:20 • (MS) R3274211-6 12/19/17 15:22 • (MSD) R3274211-7 12/19/17 15:23

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	5.00	0.223	5.14	5.26	98.2	101	1	90-110			2.48	20

Method Blank (MB)

(MB) R3272836-1 12/14/17 00:12

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
COD	U		3	10.0

L955243-01 Original Sample (OS) • Duplicate (DUP)

(OS) L955243-01 12/14/17 00:13 • (DUP) R3272836-4 12/14/17 00:13

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	610	602	1	1.28		20

L957172-08 Original Sample (OS) • Duplicate (DUP)

(OS) L957172-08 12/14/17 00:20 • (DUP) R3272836-7 12/14/17 00:20

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	30.3	32.7	1	7.43		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3272836-2 12/14/17 00:13 • (LCSD) R3272836-3 12/14/17 00:13

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
COD	242	246	236	102	97.7	90-110			4	20

L957143-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957143-08 12/14/17 00:15 • (MS) R3272836-5 12/14/17 00:15 • (MSD) R3272836-6 12/14/17 00:16

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
COD	400	ND	443	452	111	113	1	80-120			1.96	20

Method Blank (MB)

(MB) R3272830-1 12/13/17 07:18

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.0099	0.100
Nitrate	U		0.0227	0.100
Sulfate	U		0.0774	5.00

L957143-03 Original Sample (OS) • Duplicate (DUP)

(OS) L957143-03 12/13/17 15:04 • (DUP) R3272830-4 12/13/17 15:58

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0		15
Chloride	52.5	52.6	1	0.29		15
Fluoride	ND	0.000	1	0		15
Nitrate	1.10	1.13	1	2.62		15
Sulfate	ND	5.00	1	9.8	J	15

L957203-03 Original Sample (OS) • Duplicate (DUP)

(OS) L957203-03 12/13/17 17:34 • (DUP) R3272830-6 12/13/17 17:47

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	3.91	0.000	1	200	P1	15
Chloride	16.0	16.0	1	0.372		15
Fluoride	0.199	0.169	1	16	P1	15
Nitrate	0.650	0.652	1	0.399		15
Sulfate	34.4	34.6	1	0.714		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3272830-2 12/13/17 07:32 • (LCSD) R3272830-3 12/13/17 07:45

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromide	40.0	39.7	39.6	99.4	99	80-120			0.371	15
Chloride	40.0	39.8	39.7	99.4	99.3	80-120			0.14	15
Fluoride	8.00	8.21	8.21	103	103	80-120			0.0779	15
Nitrate	8.00	8.32	8.30	104	104	80-120			0.174	15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3272830-2 12/13/17 07:32 • (LCSD) R3272830-3 12/13/17 07:45

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Sulfate	40.0	40.1	40.1	100	100	80-120			0.173	15

L957143-07 Original Sample (OS) • Matrix Spike (MS)

(OS) L957143-07 12/13/17 16:12 • (MS) R3272830-5 12/13/17 16:25

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	47.4	94.8	1	80-120	
Chloride	50.0	6.65	56.1	98.9	1	80-120	
Fluoride	5.00	ND	4.97	99.3	1	80-120	
Nitrate	5.00	0.441	5.32	97.7	1	80-120	
Sulfate	50.0	ND	50.1	99	1	80-120	

L957203-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957203-03 12/13/17 17:34 • (MS) R3272830-7 12/13/17 18:28 • (MSD) R3272830-8 12/13/17 18:42

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	3.91	49.6	50.1	91.3	92.4	1	80-120			1.05	15
Chloride	50.0	16.0	66.8	66.3	102	101	1	80-120			0.702	15
Fluoride	5.00	0.199	5.29	5.31	102	102	1	80-120			0.434	15
Nitrate	5.00	0.650	5.77	5.72	102	101	1	80-120			0.878	15
Sulfate	50.0	34.4	85.6	85.0	102	101	1	80-120			0.696	15

Method Blank (MB)

(MB) R3273350-1 12/15/17 08:48

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.000049	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273350-2 12/15/17 08:50 • (LCSD) R3273350-3 12/15/17 08:52

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	0.00288	0.00270	96	89.9	80-120			6.55	20

L957143-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957143-02 12/15/17 08:55 • (MS) R3273350-4 12/15/17 08:57 • (MSD) R3273350-5 12/15/17 08:59

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	ND	0.00289	0.00279	96.4	92.9	1	75-125			3.73	20

Method Blank (MB)

(MB) R3273188-1 12/14/17 20:37

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury,Dissolved	0.000103	J	0.000049	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273188-2 12/14/17 20:39 • (LCSD) R3273188-3 12/14/17 20:42

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	0.00303	0.00301	101	100	80-120			0.652	20

L957143-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957143-02 12/14/17 20:44 • (MS) R3273188-4 12/14/17 20:46 • (MSD) R3273188-5 12/14/17 20:48

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	ND	0.00294	0.00297	98.1	99.1	1	75-125			0.998	20

Method Blank (MB)

(MB) R3274308-1 12/19/17 16:43

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron,Dissolved	U		0.0126	0.200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274308-2 12/19/17 16:46 • (LCSD) R3274308-3 12/19/17 16:49

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Boron,Dissolved	1.00	0.975	0.994	97.5	99.4	80-120			1.91	20

L958177-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L958177-02 12/19/17 16:53 • (MS) R3274308-5 12/19/17 16:59 • (MSD) R3274308-6 12/19/17 17:02

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron,Dissolved	1.00	ND	1.00	1.01	100	101	1	75-125			0.965	20

Method Blank (MB)

(MB) R3274323-1 12/19/17 16:27

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	0.0194	J	0.0126	0.200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274323-2 12/19/17 16:29 • (LCSD) R3274323-3 12/19/17 16:32

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Boron	1.00	1.01	0.955	101	95.5	80-120			5.34	20

L957143-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957143-01 12/19/17 16:35 • (MS) R3274323-5 12/19/17 16:40 • (MSD) R3274323-6 12/19/17 16:42

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1.00	ND	0.995	1.01	97.2	98.2	1	75-125			0.973	20

Method Blank (MB)

(MB) R3274363-2 12/19/17 18:55

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum,Dissolved	0.00832	J	0.00515	0.100
Antimony,Dissolved	U		0.000754	0.00200
Arsenic,Dissolved	U		0.00025	0.00200
Barium,Dissolved	U		0.00036	0.00500
Beryllium,Dissolved	U		0.00012	0.00200
Cadmium,Dissolved	U		0.00016	0.00100
Calcium,Dissolved	U		0.046	1.00
Chromium,Dissolved	0.000668	J	0.00054	0.00200
Copper,Dissolved	0.000642	J	0.00052	0.00500
Cobalt,Dissolved	U		0.00026	0.00200
Iron,Dissolved	U		0.015	0.100
Lead,Dissolved	U		0.00024	0.00200
Magnesium,Dissolved	U		0.1	1.00
Manganese,Dissolved	0.000863	J	0.00025	0.00500
Nickel,Dissolved	0.000547	J	0.00035	0.00200
Potassium,Dissolved	U		0.037	1.00
Selenium,Dissolved	U		0.00038	0.00200
Silver,Dissolved	U		0.00031	0.00200
Sodium,Dissolved	U		0.11	1.00
Thallium,Dissolved	U		0.00019	0.00200
Vanadium,Dissolved	0.000544	J	0.00018	0.00500
Zinc,Dissolved	U		0.00256	0.0250

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274363-3 12/19/17 18:58 • (LCSD) R3274363-4 12/19/17 19:02

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	5.48	5.25	110	105	80-120			4.21	20
Antimony,Dissolved	0.0500	0.0552	0.0544	110	109	80-120			1.44	20
Arsenic,Dissolved	0.0500	0.0537	0.0528	107	106	80-120			1.75	20
Barium,Dissolved	0.0500	0.0498	0.0475	99.6	95	80-120			4.75	20
Beryllium,Dissolved	0.0500	0.0480	0.0467	96	93.4	80-120			2.8	20
Cadmium,Dissolved	0.0500	0.0494	0.0480	98.8	96.1	80-120			2.76	20
Calcium,Dissolved	5.00	5.18	4.99	104	99.8	80-120			3.67	20
Chromium,Dissolved	0.0500	0.0520	0.0509	104	102	80-120			2.17	20
Copper,Dissolved	0.0500	0.0553	0.0534	111	107	80-120			3.57	20
Cobalt,Dissolved	0.0500	0.0526	0.0516	105	103	80-120			1.9	20
Iron,Dissolved	5.00	5.46	5.31	109	106	80-120			2.82	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274363-3 12/19/17 18:58 • (LCSD) R3274363-4 12/19/17 19:02

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead,Dissolved	0.0500	0.0516	0.0500	103	100	80-120			3.07	20
Magnesium,Dissolved	5.00	5.34	5.15	107	103	80-120			3.65	20
Manganese,Dissolved	0.0500	0.0509	0.0497	102	99.4	80-120			2.48	20
Nickel,Dissolved	0.0500	0.0529	0.0522	106	104	80-120			1.35	20
Potassium,Dissolved	5.00	5.37	5.19	107	104	80-120			3.42	20
Selenium,Dissolved	0.0500	0.0505	0.0484	101	96.9	80-120			4.24	20
Silver,Dissolved	0.0500	0.0504	0.0495	101	99.1	80-120			1.8	20
Sodium,Dissolved	5.00	5.34	5.15	107	103	80-120			3.53	20
Thallium,Dissolved	0.0500	0.0526	0.0507	105	101	80-120			3.65	20
Vanadium,Dissolved	0.0500	0.0505	0.0496	101	99.3	80-120			1.78	20
Zinc,Dissolved	0.0500	0.0530	0.0520	106	104	80-120			1.83	20

L957195-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957195-01 12/19/17 19:06 • (MS) R3274363-6 12/19/17 19:13 • (MSD) R3274363-7 12/19/17 19:17

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	U	5.38	5.24	108	105	1	75-125			2.49	20
Antimony,Dissolved	0.0500	0.00112	0.0582	0.0558	114	109	1	75-125			4.16	20
Arsenic,Dissolved	0.0500	0.0142	0.0667	0.0645	105	101	1	75-125			3.29	20
Barium,Dissolved	0.0500	0.106	0.156	0.154	99.3	96.2	1	75-125			0.995	20
Beryllium,Dissolved	0.0500	U	0.0474	0.0452	94.8	90.5	1	75-125			4.64	20
Cadmium,Dissolved	0.0500	U	0.0509	0.0486	102	97.1	1	75-125			4.62	20
Calcium,Dissolved	5.00	95.7	102	101	121	114	1	75-125			0.351	20
Chromium,Dissolved	0.0500	U	0.0506	0.0483	101	96.7	1	75-125			4.46	20
Copper,Dissolved	0.0500	0.00176	0.0529	0.0503	102	97.1	1	75-125			5.04	20
Cobalt,Dissolved	0.0500	0.000367	0.0513	0.0484	102	96	1	75-125			5.93	20
Potassium,Dissolved	5.00	17.8	23.1	23.1	105	107	1	75-125			0.32	20
Iron,Dissolved	5.00	U	5.33	5.06	107	101	1	75-125			5.05	20
Lead,Dissolved	0.0500	0.000326	0.0519	0.0496	103	98.5	1	75-125			4.57	20
Magnesium,Dissolved	5.00	40.5	45.7	45.6	106	102	1	75-125			0.378	20
Manganese,Dissolved	0.0500	0.0884	0.137	0.134	98.1	91.4	1	75-125			2.44	20
Nickel,Dissolved	0.0500	0.00315	0.0532	0.0512	100	96.2	1	75-125			3.86	20
Silver,Dissolved	0.0500	U	0.0498	0.0474	99.7	94.9	1	75-125			4.95	20
Sodium,Dissolved	5.00	110	115	115	89.1	102	1	75-125			0.563	20
Thallium,Dissolved	0.0500	U	0.0530	0.0508	106	102	1	75-125			4.23	20
Vanadium,Dissolved	0.0500	0.00185	0.0520	0.0499	100	96	1	75-125			4.27	20
Zinc,Dissolved	0.0500	0.00332	0.0519	0.0491	97.2	91.7	1	75-125			5.47	20

Method Blank (MB)

(MB) R3274036-1 12/18/17 21:27

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	U		0.00515	0.100
Antimony	U		0.000754	0.00200
Arsenic	U		0.00025	0.00200
Barium	U		0.00036	0.00500
Beryllium	U		0.00012	0.00200
Cadmium	U		0.00016	0.00100
Calcium	U		0.046	1.00
Chromium	U		0.00054	0.00200
Copper	U		0.00052	0.00500
Cobalt	U		0.00026	0.00200
Iron	U		0.015	0.100
Lead	0.000302	J	0.00024	0.00200
Magnesium	U		0.1	1.00
Manganese	U		0.00025	0.00500
Nickel	U		0.00035	0.00200
Potassium	U		0.037	1.00
Selenium	U		0.00038	0.00200
Silver	U		0.00031	0.00200
Sodium	U		0.11	1.00
Thallium	U		0.00019	0.00200
Vanadium	0.000319	J	0.00018	0.00500
Zinc	U		0.00256	0.0250

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274036-2 12/18/17 21:31 • (LCSD) R3274036-3 12/18/17 21:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	4.85	4.85	97.1	97	80-120			0.0783	20
Antimony	0.0500	0.0542	0.0543	108	109	80-120			0.152	20
Arsenic	0.0500	0.0508	0.0510	102	102	80-120			0.457	20
Barium	0.0500	0.0476	0.0485	95.2	96.9	80-120			1.79	20
Beryllium	0.0500	0.0490	0.0489	97.9	97.8	80-120			0.0849	20
Cadmium	0.0500	0.0484	0.0483	96.9	96.6	80-120			0.239	20
Calcium	5.00	4.95	4.99	99.1	99.7	80-120			0.634	20
Chromium	0.0500	0.0507	0.0507	101	101	80-120			0.0485	20
Copper	0.0500	0.0525	0.0519	105	104	80-120			1.02	20
Cobalt	0.0500	0.0520	0.0520	104	104	80-120			0.123	20
Iron	5.00	5.11	5.12	102	102	80-120			0.172	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274036-2 12/18/17 21:31 • (LCSD) R3274036-3 12/18/17 21:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead	0.0500	0.0495	0.0495	98.9	99	80-120			0.0341	20
Magnesium	5.00	5.14	5.13	103	103	80-120			0.0639	20
Manganese	0.0500	0.0489	0.0493	97.7	98.7	80-120			0.988	20
Nickel	0.0500	0.0519	0.0518	104	104	80-120			0.304	20
Potassium	5.00	5.18	5.21	104	104	80-120			0.616	20
Selenium	0.0500	0.0494	0.0493	98.7	98.6	80-120			0.168	20
Silver	0.0500	0.0508	0.0509	102	102	80-120			0.185	20
Sodium	5.00	5.10	5.08	102	102	80-120			0.424	20
Thallium	0.0500	0.0494	0.0499	98.8	99.8	80-120			0.993	20
Vanadium	0.0500	0.0493	0.0496	98.7	99.2	80-120			0.51	20
Zinc	0.0500	0.0512	0.0522	102	104	80-120			1.89	20

L957205-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957205-02 12/18/17 21:39 • (MS) R3274036-5 12/18/17 21:46 • (MSD) R3274036-6 12/18/17 21:50

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	ND	5.06	4.96	99.7	97.9	1	75-125			1.88	20
Antimony	0.0500	ND	0.0571	0.0558	114	112	1	75-125			2.27	20
Arsenic	0.0500	0.00380	0.0543	0.0529	101	98.1	1	75-125			2.6	20
Barium	0.0500	0.0218	0.0723	0.0712	101	98.8	1	75-125			1.57	20
Beryllium	0.0500	ND	0.0496	0.0489	99.3	97.9	1	75-125			1.43	20
Cadmium	0.0500	ND	0.0531	0.0514	106	103	1	75-125			3.29	20
Calcium	5.00	88.7	95.5	93.4	135	93.9	1	75-125	V		2.19	20
Chromium	0.0500	ND	0.0523	0.0513	102	99.8	1	75-125			1.77	20
Copper	0.0500	0.00810	0.0585	0.0573	101	98.3	1	75-125			2.21	20
Cobalt	0.0500	ND	0.0517	0.0504	103	101	1	75-125			2.55	20
Potassium	5.00	8.33	13.6	13.5	105	103	1	75-125			0.792	20
Iron	5.00	0.193	5.30	5.20	102	100	1	75-125			1.89	20
Lead	0.0500	ND	0.0519	0.0509	103	101	1	75-125			1.83	20
Magnesium	5.00	21.9	27.1	26.9	104	100	1	75-125			0.763	20
Manganese	0.0500	0.0116	0.0612	0.0603	99.1	97.5	1	75-125			1.4	20
Nickel	0.0500	ND	0.0512	0.0496	101	97.6	1	75-125			3.03	20
Selenium	0.0500	0.0479	0.104	0.103	112	110	1	75-125			0.708	20
Silver	0.0500	ND	0.0510	0.0498	102	99.6	1	75-125			2.35	20
Sodium	5.00	503	512	508	166	96.1	1	75-125	V		0.684	20
Thallium	0.0500	ND	0.0522	0.0516	104	103	1	75-125			1.08	20
Vanadium	0.0500	0.00603	0.0582	0.0567	104	101	1	75-125			2.49	20
Zinc	0.0500	ND	0.0532	0.0481	106	96.1	1	75-125			10.2	20

Method Blank (MB)

(MB) R3272956-2 12/13/17 20:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acetone	U		0.0100	0.0500
Acrylonitrile	U		0.00187	0.0100
Benzene	U		0.000331	0.00100
Bromodichloromethane	U		0.000380	0.00100
Bromochloromethane	U		0.000520	0.00100
Bromoform	U		0.000469	0.00100
Bromomethane	U		0.000866	0.00500
Carbon disulfide	U		0.000275	0.00100
Carbon tetrachloride	U		0.000379	0.00100
Chlorobenzene	U		0.000348	0.00100
Chlorodibromomethane	U		0.000327	0.00100
Chloroethane	U		0.000453	0.00500
Chloroform	U		0.000324	0.00500
Chloromethane	U		0.000276	0.00250
1,2-Dibromo-3-Chloropropane	U		0.00133	0.00500
1,2-Dibromoethane	U		0.000381	0.00100
Dibromomethane	U		0.000346	0.00100
1,2-Dichlorobenzene	U		0.000349	0.00100
1,4-Dichlorobenzene	U		0.000274	0.00100
trans-1,4-Dichloro-2-butene	U		0.000866	0.00250
1,1-Dichloroethane	U		0.000259	0.00100
1,2-Dichloroethane	U		0.000361	0.00100
1,1-Dichloroethene	U		0.000398	0.00100
cis-1,2-Dichloroethene	U		0.000260	0.00100
trans-1,2-Dichloroethene	U		0.000396	0.00100
1,2-Dichloropropane	U		0.000306	0.00100
cis-1,3-Dichloropropene	U		0.000418	0.00100
trans-1,3-Dichloropropene	U		0.000419	0.00100
Ethylbenzene	U		0.000384	0.00100
2-Hexanone	U		0.00382	0.0100
Iodomethane	U		0.00171	0.0100
2-Butanone (MEK)	U		0.00393	0.0100
Methylene Chloride	U		0.00100	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.00214	0.0100
Styrene	U		0.000307	0.00100
1,1,1,2-Tetrachloroethane	U		0.000385	0.00100
1,1,2,2-Tetrachloroethane	U		0.000130	0.00100
Tetrachloroethene	U		0.000372	0.00100
Toluene	U		0.000412	0.00100
1,1,1-Trichloroethane	U		0.000319	0.00100

Method Blank (MB)

(MB) R3272956-2 12/13/17 20:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
1,1,2-Trichloroethane	U		0.000383	0.00100
Trichloroethene	U		0.000398	0.00100
Trichlorofluoromethane	U		0.00120	0.00500
1,2,3-Trichloropropane	U		0.000807	0.00250
Vinyl acetate	U		0.00163	0.0100
Vinyl chloride	U		0.000259	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	*102*			*80.0-120*
(S) Dibromofluoromethane	*105*			*76.0-123*
(S) a,a,a-Trifluorotoluene	*93.5*			*80.0-120*
(S) 4-Bromofluorobenzene	*112*			*80.0-120*

Laboratory Control Sample (LCS)

(LCS) R3272956-1 12/13/17 19:40

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acetone	0.125	0.226	181	10.0-160	J4
Acrylonitrile	0.125	0.125	99.8	60.0-142	
Benzene	0.0250	0.0263	105	69.0-123	
Bromodichloromethane	0.0250	0.0236	94.5	76.0-120	
Bromochloromethane	0.0250	0.0248	99.0	76.0-122	
Bromoform	0.0250	0.0240	96.1	67.0-132	
Bromomethane	0.0250	0.0193	77.3	18.0-160	
Carbon disulfide	0.0250	0.0254	102	55.0-127	
Carbon tetrachloride	0.0250	0.0234	93.8	63.0-122	
Chlorobenzene	0.0250	0.0258	103	79.0-121	
Chlorodibromomethane	0.0250	0.0245	98.2	75.0-125	
Chloroethane	0.0250	0.0190	75.9	47.0-152	
Chloroform	0.0250	0.0241	96.3	72.0-121	
Chloromethane	0.0250	0.0198	79.1	48.0-139	
1,2-Dibromo-3-Chloropropane	0.0250	0.0168	67.0	64.0-127	
1,2-Dibromoethane	0.0250	0.0254	102	77.0-123	
Dibromomethane	0.0250	0.0248	99.3	78.0-120	
1,2-Dichlorobenzene	0.0250	0.0256	102	80.0-120	
1,4-Dichlorobenzene	0.0250	0.0248	99.2	77.0-120	
trans-1,4-Dichloro-2-butene	0.0250	0.0245	97.9	55.0-134	
1,1-Dichloroethane	0.0250	0.0246	98.5	70.0-126	
1,2-Dichloroethane	0.0250	0.0248	99.3	67.0-126	

Laboratory Control Sample (LCS)

(LCS) R3272956-1 12/13/17 19:40

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
1,1-Dichloroethene	0.0250	0.0262	105	64.0-129	
cis-1,2-Dichloroethene	0.0250	0.0247	98.8	73.0-120	
trans-1,2-Dichloroethene	0.0250	0.0246	98.5	71.0-121	
1,2-Dichloropropane	0.0250	0.0242	97.0	75.0-125	
cis-1,3-Dichloropropene	0.0250	0.0256	102	79.0-123	
trans-1,3-Dichloropropene	0.0250	0.0239	95.6	74.0-127	
Ethylbenzene	0.0250	0.0264	105	77.0-120	
2-Hexanone	0.125	0.138	111	58.0-147	
Iodomethane	0.125	0.124	98.9	57.0-140	
2-Butanone (MEK)	0.125	0.155	124	37.0-158	
Methylene Chloride	0.0250	0.0240	95.9	66.0-121	
4-Methyl-2-pentanone (MIBK)	0.125	0.120	95.9	59.0-143	
Styrene	0.0250	0.0278	111	78.0-124	
1,1,1,2-Tetrachloroethane	0.0250	0.0238	95.1	75.0-122	
1,1,2,2-Tetrachloroethane	0.0250	0.0260	104	71.0-122	
Tetrachloroethene	0.0250	0.0235	93.9	70.0-127	
Toluene	0.0250	0.0253	101	77.0-120	
1,1,1-Trichloroethane	0.0250	0.0240	95.8	68.0-122	
1,1,2-Trichloroethane	0.0250	0.0252	101	78.0-120	
Trichloroethene	0.0250	0.0233	93.0	78.0-120	
Trichlorofluoromethane	0.0250	0.0233	93.2	56.0-137	
1,2,3-Trichloropropane	0.0250	0.0262	105	72.0-124	
Vinyl acetate	0.125	0.109	86.8	46.0-160	
Vinyl chloride	0.0250	0.0228	91.1	64.0-133	
Xylenes, Total	0.0750	0.0781	104	77.0-120	
(S) Toluene-d8			*103*	*80.0-120*	
(S) Dibromofluoromethane			*102*	*76.0-123*	
(S) a,a,a-Trifluorotoluene			*95.9*	*80.0-120*	
(S) 4-Bromofluorobenzene			*114*	*80.0-120*	

Method Blank (MB)

(MB) R3273576-1 12/15/17 19:43

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ethylene Dibromide	U		0.00000240	0.0000100
1,2-Dibromo-3-Chloropropane	U		0.00000430	0.0000200

L957522-02 Original Sample (OS) • Duplicate (DUP)

(OS) L957522-02 12/15/17 20:28 • (DUP) R3273576-3 12/15/17 20:17

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ethylene Dibromide	ND	0.000	1	0.000		20
1,2-Dibromo-3-Chloropropane	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273576-4 12/15/17 22:10 • (LCSD) R3273576-5 12/16/17 00:15

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ethylene Dibromide	0.000250	0.000204	0.000204	81.7	81.7	60.0-140			0.0424	20
1,2-Dibromo-3-Chloropropane	0.000250	0.000212	0.000210	84.7	84.1	60.0-140			0.619	20

Laboratory Control Sample (LCS)

(LCS) R3273926-2 12/16/17 22:49

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ethylene Dibromide	0.000250	0.000220	84.3	60.0-140	
1,2-Dibromo-3-Chloropropane	0.000250	0.000240	87.9	60.0-140	

L957522-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L957522-03 12/15/17 20:05 • (MS) R3273576-2 12/15/17 19:54

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ethylene Dibromide	0.000100	ND	0.000108	108	1	72.0-146	
1,2-Dibromo-3-Chloropropane	0.000100	ND	0.000112	112	1	63.0-149	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J4	The associated batch QC was outside the established quality control range for accuracy.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.**
***** Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina [1]	DW21704
Florida	E87487	North Carolina [2]	41
Georgia	NELAP	North Dakota	R-140
Georgia [1]	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky [1]	90010	South Dakota	n/a
Kentucky [2]	16	Tennessee [1 4]	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

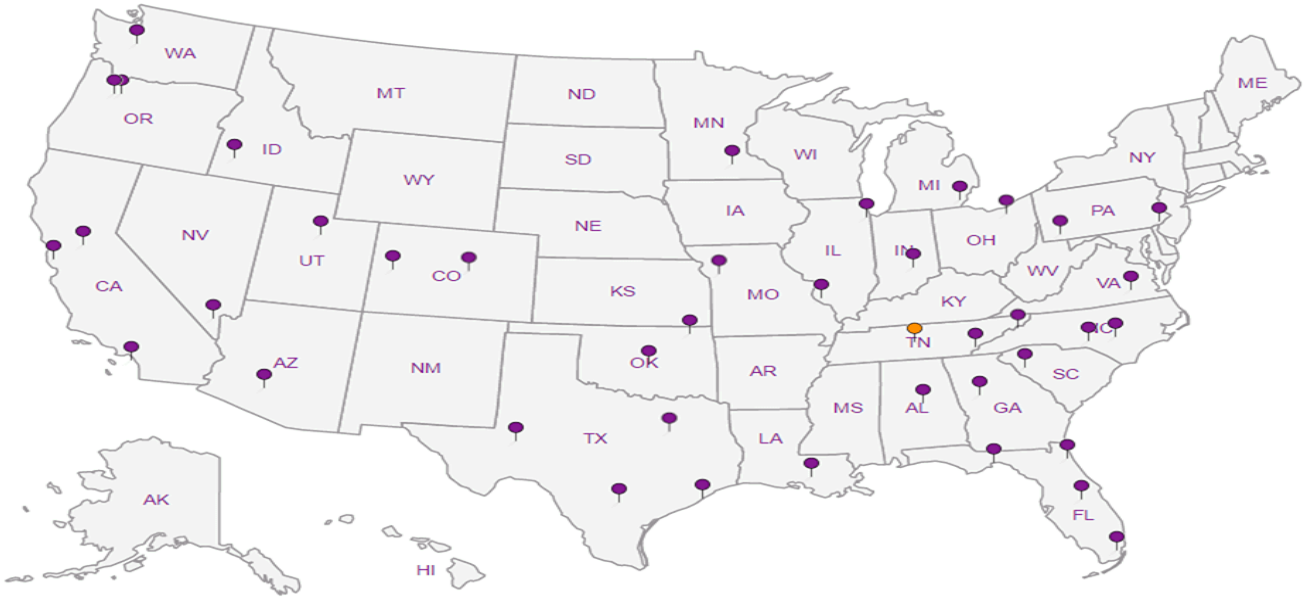
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [n/a] Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Pres Chk

Report to: **Philip Campbell**

Email To: **mjohnson@cecinc.com,pcampbell@cecinc.com,kcl**

Project Description: **EWS Landfill**

City/State Collected:

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **142-059**

Lab Project # **CEC-142-059**

Collected by (print): **Philip Campbell**

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ___

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALK 125mlHDPE-NoPres	Bromide,Cl,F,NO3,SO4 125mlHDPE-NoPres	COD 250mlHDPE-H2SO4	COLILERT-Microbiological	Diss. Metals 250mlHDPE-HNO3	Diss. Metals 250mlHDPE-NoPres	NH3 125mlHDPE-H2SO4	SV8011 40mlClr-NaThio	Total Metals + Hard 250mlHDPE-HNO3 *	Total Metals +Hard 250mlHDPE-HNO3 *	Remarks	Sample # (lab only)
MW-1	Grab	GW	—	12-1-17	1100	12	X	X	X		X		X	X	X			01
~~MW-3~~		~~GW~~				~~12~~	~~X~~	~~X~~	~~X~~		~~X~~		~~X~~	~~X~~	~~X~~	—	No sample	
MW-4		GW	—	12-1-17	1700	12	X	X	X		X		X	X		X		02
MW-5		GW	—		1210	14	X	X	X	X	X	X	X	X	X			03
TMW-1		GW	—		13:45	12	X	X	X		X		X	X	X			04
TMW-2		GW	—		1515	12	X	X	X		X		X	X		X		05
TMW-3		GW	—		1610	12	X	X	X		X		X	X		X		06
DUPLICATE		GW	—		—	12	X	X	X		X		X	X				07
FIELD BLANK		GW	—		14:35	12	X	X	X		X		X	X	X			08
TRIP BLANK		GW	—	—	—	~~1~~ 4												09

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Dissolved metals are field filtered and preserved
Total + Dissolved Metals = App I. + Boron, Ca, Fe, Mg, Mn, K, Na

pH ____ Temp ____
Flow ____ Other ____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking #

Relinquished by : (Signature) — Date: 12-12-17 — Time:
Received by: (Signature)

Relinquished by : (Signature) — Date: — Time:
Received by: (Signature)

Relinquished by : (Signature) — Date: — Time:
Received for lab by: (Signature)

Trip Blank Received: (Yes / No) HCl / MeoH TBR

Temp: 3.5 °C Bottles Received: 96

Date: 12/13/17 Time: 0830

If preservation required by Login: Date/Time

Hold:

Condition: (NCF) / OK

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Chain of Custody Page 1 of 2

ESC LABORATORIES
a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 951143

Table #

Acctnum: **CEC**
Template: **T128177**
Prelogin: **P628684**
TSR: **341 - John Hawkins**
PB: 11-29-17 CM

Shipped Via: **Courier**

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Pres Chk

Report to: Philip Campbell

Email To: mjohnson@cecinc.com,pcampbell@cecinc.com,kcl

Project Description: EWS Landfill

City/State Collected:

Phone: 615-333-7797
Fax: 615-333-7751

Client Project # 142-059

Lab Project # CEC-142-059

Collected by (print): Ph. Tip Campbell

Site/Facility ID #

P.O. #

Collected by (signature): Phil Campbell

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

No. of Cntrs

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Total Metals+ Hard 250mlHDPE-HNO3 *	V8260AP1 40mlAmb-HCl	V8260AP1 40mlAmb-HCl-Blk	Remarks	Sample # (lab only)
MW-1	Grab	GW	—	12-1-17	1100	12		X			01
~~MW-3~~		~~GW~~				12		X		No Sample	
MW-4		GW	—	12-1-17	1700	12		X			02
MW-5		GW	—		1210	14		X			03
TMW-1		GW	—		1345	12		X			04
TMW-2		GW	—		1515	12		X			05
TMW-3		GW	—		1610	12		X			06
DUPLICATE		GW	—		—	12	X	X			07
FIELD BLANK		GW	—	↓	1435	12		X			08
TRIP BLANK		GW	—	—	—	1			X		09

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Dissolved metals are field filtered and preserved
Total & Dissolved Metals = Appl + Al, Boron, Ca, Fe, Mg, Mn, K, Na

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCl / MeoH TBR	If preservation required by Login: Date/Time
Phil Campbell	12-12-17				
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 3.5 °C Bottles Received: 96	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 12/13/17 Time: 830	Hold: Condition: NCF / OK

Chain of Custody Page 2 of 2

ESC LABORATORY SCIENCES
a subsidiary of Accelerated

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 957143

Table #

Acctnum: CEC
Template: T128177
Prelogin: P628684
TSR: 341 - John Hawkins
PB: 11-29-17 CM

Shipped Via: Courier

ESC Lab Sciences
Non-Conformance Form

Login #957143	Client: CEC	Date:12/13	Evaluated by:Matt S

Non-Conformance (check applicable items)

	Sample Integrity		Chain of Custody Clarification		
	Parameter(s) past holding time	x	Login Clarification Needed		**If Broken Container:**
	Improper temperature		Chain of custody is incomplete		Insufficient packing material around container
	Improper container type		Please specify Metals requested.		Insufficient packing material inside cooler
	Improper preservation		Please specify TCLP requested.		Improper handling by carrier (FedEx / UPS / Courie
	Insufficient sample volume.		Received additional samples not listed on coc.		Sample was frozen
	Sample is biphasic.		Sample ids on containers do not match ids on coc		Container lid not intact
	Vials received with headspace.		Trip Blank not received.		**If no Chain of Custody:**
	Broken container		Client did not "X" analysis.		Received by:
	Broken container:		Chain of Custody is missing		Date/Time:
	Sufficient sample remains				Temp./Cont. Rec./pH:
					Carrier:
					Tracking#

Login Comments: 2 NITRATEs OOH

Client informed by:	x	Call	x	Email	x	Voice Mail		Date: 12-13-17	Time: 1:21
TSR Initials: JVH	Client Contact: Philip Campbell								

Login Instructions:

Please proceed and qualify as needed

EQUIPMENT CALIBRATION LOG

EQUIPMENT CALIBRATION FORM

NAME OF REPRESENTATIVE	Philip Campbell
LOCATION	Former EWS - Site
DATE AND TIME	12-11-17 / 9:40
Equipment and Model # (ex. YSI Pro Plus 556)	YSI - Pro Plus w/ quattro cable
Equipment Serial #	YSI #2

3-point Calibration completed

pH Calibration

pH buffer Calibration Standard	Buffer solution exp. date	Pre-Cal Reading (S.U.)	ph mV Value	Accepted Range mV	Within Range? (Yes or No)	Post-Cal Reading (S.U.)	Calibrated? (yes/no)
4	9/2018	4.28	172	160 to 180	yes	4.01	yes
7	9/2018	7.09	23	+/-50	"	7.00	yes
10	9/2018	9.85	-177	-160 to -180	"	9.99	yes

Temperature Calibration Check

Cert. Thermometer Value (deg C)	Meter Value (deg C)
—	—

DO Calibration

Actual Barometric Pressure	Barometric Pressure (mm Hg)	D.O. Value (% Saturated)	Unit reading (%)	% DO accepted?

Specific Conductivity Calibration

Sp. Conductivity Calibration Standard buffer solution	Buffer solution exp. date	Pre Cal Reading (umhos)	Post Cal Reading (umhos)
1000	12/11/18 (1yr.)	1153	1001

ORP Calibration

ORP Calibration (mV)	Buffer solution exp. date	Pre Cal Reading (mV)	Post Cal Reading (mV)

Hach Model 2100P Turbidimeter Calibration

Calibration verification Test performed and passed?	NTU Standard	Within Range? (Yes/No)	Measured Value	Stored?	Final Verification test passed? (Yes/No)
Yes - @ 10 NTU	20				
No	100				
Note: if verification passed, calibration not required	800				

Hach 2100Q Turbidimeter

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-1
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 40's
DATE & TIME	12-11-17 / 10:20	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	~~Peristaltic Pump~~ Bladder pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	30.5	**SAMPLING EQUIPMENT**	~~Bailer~~ Bladder pump
DEPTH TO WATER (feet)	22.99	**IS SAMPLE EQUIPMENT DEDICATED?**	~~No~~ yes
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	7.51	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	3.0	**EQUIPMENT BLANK COLLECTED?**	N/A

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	DTW*
0.5	10:32	3	15.4	5.24	64.3	0.76	84.7	59.9	23.25
1.0	10:35	6	15.6	5.26	65.1	0.47	83.9	32.4	23.26
1.25	10:38	9	15.7	5.44	76.4	0.42	76.3	19.5	23.26
1.50	10:41	12	15.8	5.51	86.0	0.40	74.7	12.2	23.26
1.80	10:44	15	15.8	5.60	97.0	0.41	71.9	8.65	23.26
2.10	10:47	18	15.9	5.63	100.8	0.30	72.5	6.01	23.26
2.60	10:50	21	15.9	5.66	107.1	0.26	72.4	4.12	23.26
3.00	10:53	24	15.9	5.66	110.9	0.24	73.0	4.06	23.26

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
3.0	1100	24	15.9	5.66	110.9	0.24	73.0	4.06

Sample Charateristics (Odor, Color)	Clear, No odor	**Preservatives Used**	
Number of Containers	15	**Sampler Signature**	Phil Campbell

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	yes/yes
Well Clear of Weeds/Accessible?	yes/yes	**Fittings/Well Head Condition**	good
Pad/Casing Quality	good	**Lock Condition**	good

* DTW = Distance to water

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-2
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 40's
DATE & TIME	12-11-17/16:20	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	NA, parameters only	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	10.00	**SAMPLING EQUIPMENT**	YSI 600 pro plus
DEPTH TO WATER (feet)	6.11	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	NS
WATER COLUMN (feet)	3.89	**FIELD BLANK COLLECTED?**	NS
PURGE VOLUME (gallons)	-	**EQUIPMENT BLANK COLLECTED?**	NS

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	16:20	0	12.8	5.48	256.3	2.53	-23.8	953

Sample Charateristics (Odor, Color)	NS	**Preservatives Used**	NS
Number of Containers	NS	**Sampler Signature**	

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	good
Well Clear of Weeds/Accessible?	yes/yes	**Fittings/Well Head Condition**	good
Pad/Casing Quality	good/good	**Lock Condition**	good

Stop-> purge Let it charge	2.80	9:43	52	14.9	5.35	499.4	0.75	106.0		NTU 863	Stop 23.82 at pump

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

Continued next page →

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-3
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	Cloudy, windy, 40's
DATE & TIME	12-12-17 / 8:45	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	~~Peristaltic Pump~~ Bladder pump	**FIELD REPRESENTATIVE**	~~Philip~~ Campbell
TOTAL WELL DEPTH (feet)	27.00	**SAMPLING EQUIPMENT**	~~Bailer~~ Bladder pump
DEPTH TO WATER (feet)	12-11-17 -> 19.87	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	7.13	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	3.60	**EQUIPMENT BLANK COLLECTED?**	NA

DTW start - 19.95

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	DTW
0	8:54	3	14.3	5.45	489.1	1.83	106.5	85.3	20.90
0.5	8:59	8	17.2	5.42	540	0.39	103.0	68.5	21.50
0.75	9:03	12	16.6	5.43	534	0.40	103.4	54.2	22.10
1.0	9:07	16	15.6	5.39	518	0.36	107.8	61.2	22.80
1.15	9:11	20	15.3	5.34	514	0.41	110.2	96.7	22.51
1.25	9:15	24	15.5	5.36	515	0.38	108.4	108.7	22.53
1.40	9:19	28	15.2	5.40	503	0.67	106.5	149	22.78
1.55	9:23	32	15.2	5.34	477.3	0.49	109.7	201	

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
3.60	NS							

Sample Charateristics (Odor, Color)	NS	**Preservatives Used**	
Number of Containers	NS	**Sampler Signature**	

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	yes/yes
Well Clear of Weeds/Accessible?	yes/yes	**Fittings/Well Head Condition**	good/good
Pad/Casing Quality	good/good	**Lock Condition**	good

1.70	9:27	36	15.2	5.38	481	0.53	108.6	258	22.87
1.80	9:31	40	15.2	5.37	495	0.62	107.5	397	23.10
1.90	9:35	44	15.2	5.37	500	0.65	106.8	450	23.50
2.0	9:39	48	15.1	5.36	501	0.67	105.8	741	23.26

** Collected sample was NOT analyzed. Dedicated pump was pulling water from screened area. Screened area was not imersed in water due to slow recharge, making it difficult to achieve homeostasis natural gw conditions. water trickling in from above raised turbidity as well as o.r. Sample was not representative of natural Gw conditions. Resample is scheduled.

Refill Time = 3 05 sec
Purge time = 5 Seconds

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	Former EWS LF	MONITORING WELL I.D.	MW-3C (continued)
LOCATION	Camden, TN	TEMPERATURE & WEATHER	PC, 40's, windy
DATE & TIME	12-12-17 (Continued)	EVENT FREQUENCY	Quarterly
PURGE METHOD	Low flow / bladder pump	FIELD REPRESENTATIVE	R. Campbell
TOTAL WELL DEPTH (feet)	27.0	SAMPLING EQUIPMENT	Ded. bladder pump.
DEPTH TO WATER (feet)	@ 11:11 A.M. - DTW = 21.30	IS SAMPLE EQUIPMENT DEDICATED?	yes
CASING DIAMETER (inches)	2	DUPLICATE COLLECTED?	No
WATER COLUMN (feet)	7.13 (initial)	FIELD BLANK COLLECTED?	No
PURGE VOLUME (gallons)	3.60	EQUIPMENT BLANK COLLECTED?	No

11:14 Resume

14.9 5.35 444.4 0.75 106.0 863

PURGE INFORMATION

DTW = 21.30

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	DTW
@ 2.5	11:14	3	16.7	5.43	548	1.34	168.1	587	22.10
2.6	11:18	7	16.8	5.28	537	1.12	158.0	187	22.60
2.75	11:22	11	16.7	5.29	515	1.03	149.6	181	22.75
3.0	11:26	15	16.4	5.27	513	1.34	137.7	395	23.50
3.15	11:30	19	16.5	5.28	514	1.25	135.2	485	23.70
3.30	11:34	23	16.5	5.28	510	1.30	132.3	566	23.72
3.45	11:38	27	16.5	5.27	511	1.32	131.7	585	23.73
3.60	11:42	31	16.5	5.28	508	1.28	130.8	601	23.74

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
3.60	1200	33 total	16.5	5.28	508	1.28	130.8	601

Sample Charateristics (Odor, Color)	~~Clear~~ Lightly cloudy / No odor	Preservatives Used	HCl, HNO3, H2SO4, Methnol
Number of Containers	12	Sampler Signature	Phil Campbell

Dissolved metals NTU = 116

WELL DATA

Number of Baffles	4	Well Cap Dedicated/In Place?	yes / yes
Well Clear of Weeds/Accessible?	yes / yes	Fittings/Well Head Condition	good / good
Pad/Casing Quality	good / good	Lock Condition	good

* ~~Mat~~ purge rate was adjusted to a very slow purge throughout low-flow sampling. Rate of recharge was very very slow. Turbidity value would increase as purging would go on. Removed 3 well volumes via low-flow. Capturing actual groundwater. Had to take sample even though turbidity was elevated.

At Filtered

After sample NTV = 811
Metals sample = 601
Dissolved Metals = 116

NTV

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	MONITORING WELL I.D.	MW-4
LOCATION	Camden, TN	TEMPERATURE & WEATHER	Cloudy
DATE & TIME	12-11-17	EVENT FREQUENCY	Quarterly
PURGE METHOD	~~Peristaltic Pump~~ Bladder pump ~~Low Flow~~	FIELD REPRESENTATIVE	Philip Campbell
TOTAL WELL DEPTH (feet)	23.1 6	SAMPLING EQUIPMENT	~~Bailer~~ Dedicated Bladder pump
DEPTH TO WATER (feet)	11.75	IS SAMPLE EQUIPMENT DEDICATED?	No
CASING DIAMETER (inches)	2	DUPLICATE COLLECTED?	Yes
WATER COLUMN (feet)	11.45	FIELD BLANK COLLECTED?	NO
PURGE VOLUME (gallons)		EQUIPMENT BLANK COLLECTED?	NA

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	
0	16:36	0	15.6	5.64	81.9	3.89	106.6	228	11.90
0.5	16:40	4	16.1	5.82	82.7	2.03	90.5	354	11.91
1.0	16:44	8	16.2	5.77	82.0	2.11	92.1	168	11.91
1.5	16:48	12	16.2	5.79	81.7	2.72	92.8	200	11.91
1.9	16:52	16	16.2	5.79	82.0	2.70	91.9	170	11.91
2.3	16:56	20	16.2	5.79	81.7	2.67	91.4	132	11.91
2.8	17.00	24	16.2	5.77	81.6	2.71	91.1	5.39	

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
2.8	17:00	24	16.2	5.77	81.6	2.71	91.1	5.33

Sample Charateristics (Odor, Color)	Clear, No odor	Preservatives Used	HCl, HNO3, NaThio
Number of Containers	12	Sampler Signature	Philip Campbell

WELL DATA

Number of Baffles	0	Well Cap Dedicated/In Place?	yes/yes
Well Clear of Weeds/Accessible?	yes/yes	Fittings/Well Head Condition	good/good
Pad/Casing Quality	good/good	Lock Condition	good

cont.

3.75	12:07	39	16.5	5.33	241.1	0.84	99.8	32.7	10.30
4.00	12:10	42	16.5	5.34	240.2	0.92	99.7	29.8	10.30
4.25	12:13	45	16.5	5.33	239.7	0.88	100.0	33.7	10.30

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-5
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 40's
DATE & TIME	12-11-17 / 11:20	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	~~Peristaltic Pump~~ Bladder pump (low flow)	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	33.85	**SAMPLING EQUIPMENT**	~~Bailer~~ Bladder pump
DEPTH TO WATER (feet)	9.41	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	24.44	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	4.25	**EQUIPMENT BLANK COLLECTED?**	No

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	DTW
0	11:28	0	15.1	5.23	260.2	3.70	106.2	354	9.91
0.5	11:31	3	16.2	5.29	262.3	0.68	98.1	247	10.10
0.75	11:34	6	16.4	5.31	259.5	0.68	99.5	206	10.11
1.0	11:37	9	16.3	5.36	254.2	0.66	100.4	180	10.23
1.25	11:40	12	16.4	5.30	253.3	0.63	100.7	141	10.24
1.50	11:43	15	16.4	5.30	252.2	0.64	100.8	112	10.27
2.0	11:46	18	16.4	5.30	250.4	0.66	100.9	96.3	10.29
2.25	11:49	21	16.4	5.31	249.1	0.68	100.4	81.6	

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
4.25	12:10	45	16.5	5.33	239.7	0.88	100.0	22.0

Sample Charateristics (Odor, Color)	Clear, No odor	**Preservatives Used**	HCl, HNO_3, NaOH, H_2SO_4
Number of Containers	12	**Sampler Signature**	Phil Campbell

+ at metals

NTU = 2.44 @ dissolved metals

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	yes/yes
Well Clear of Weeds/Accessible?	yes/yes	**Fittings/Well Head Condition**	good/good
Pad/Casing Quality	good/good	**Lock Condition**	good

2.50	11:52	24	16.5	5.31	248.0	0.68	100.4	75.8	10.29
2.75	11:55	27	16.5	5.31	246.1	0.79	100.3	61.1	10.30
3.00	11:58	30	16.5	5.32	245.2	0.72	100.3	54.5	10.30
3.25	12:01	33	16.5	5.33	243.8	0.81	99.9	45.2	10.30
3.50	12:04	36	16.5	5.32	243.2	0.83	100.0	38.1	10.30

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-1
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 40's
DATE & TIME	12-11-17 / 12:45	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	~~Peristaltic Pump~~ Bladder + Flow	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	32.5	**SAMPLING EQUIPMENT**	~~Bailer~~ Bladder pump
DEPTH TO WATER (feet)	8.70	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	1	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	23.80	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	1.25	**EQUIPMENT BLANK COLLECTED?**	No

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	DTW
0	12:48	0	15.5	5.56	95.4	4.85	100.2	>1000	8.75
0.15	12:51	3	15.6	5.65	96.3	4.71	94.2	>1000	8.76
0.25	12:54	6	15.7	5.68	94.9	4.57	93.6	>1000	8.77
0.35	12:57	9	15.7	5.68	96.6	4.57	92.2	>1000	8.78
0.50	13:01	13	16.0	5.68	97.7	4.37	91.6	>1000	8.79
0.75	13:06	18	16.0	5.67	97.5	4.45	92.1	>1000	8.79
1.0	13:11	23	16.0	5.68	97.1	4.33	92.6	>1000	8.80
1.25	13:16	28	15.9	5.67	96.6	4.35	93.3	975	8.80

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
2.25	13:45	48	16.0	5.67	94.4	4.28	94.6	315

Sample Charateristics (Odor, Color)	very lt. orange, no odor	**Preservatives Used**	HCl, HNO_3, Na thio, H_2SO_4
Number of Containers	12	**Sampler Signature**	Phil Campbell

@ metals

~~Field Filtered~~

NTU = 245

WELL DATA

Number of Baffles	0	**Well Cap Dedicated/In Place?**	yes/yes
Well Clear of Weeds/Accessible?	yes/yes	**Fittings/Well Head Condition**	good
Pad/Casing Quality	No pad	**Lock Condition**	OK

1.50	1321	33	15.9	5.67	96.6	4.28	93.6	670	8.80
1.75	1326	38	16.0	5.68	93.3	4.28	93.3	520	8.82
2.0	1331	43	16.0	5.67	94.4	4.28	96.5	440	8.82
2.25	1336	48	16.0	5.67	94.4	4.28	94.6	437	

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-2
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 40's
DATE & TIME	4-11-17	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	~~Peristaltic Pump~~ transfer Bladder pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	27.5	**SAMPLING EQUIPMENT**	~~Bailer~~ Bladder pump
DEPTH TO WATER (feet)	11.60	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	1	**DUPLICATE COLLECTED?**	NO
WATER COLUMN (feet)	15.90	**FIELD BLANK COLLECTED?**	yes / 14:35
PURGE VOLUME (gallons)	2.50	**EQUIPMENT BLANK COLLECTED?**	

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	DTW
0	14:16	0	15.6	5.60	83.1	5.90	99.4	>1000	12.11
0.25	14:21	5	15.8	5.70	88.2	5.26	92.8	>1000	12.87
0.50	14:26	10	15.9	5.69	92.7	5.05	92.9	>1000	13.79
0.75	14:31	15	16.1	5.73	91.3	5.07	92.1	>1000	14.75
1.0	14:36	20	16.1	5.72	90.8	5.19	93.8	>1000	15.12
1.25	14:41	25	16.1	5.71	91.6	5.12	93.8	>1000	16.10
1.50	14:46	30	15.9	5.73	85.6	5.48	95.0	>1000	16.13
1.75	14:51	35	16.0	5.66	86.4	5.12	97.2	>1000	16.14

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
2.50	15:15	50	16.1	5.68	94.8	5.01	93.9	>1000

Sample Charateristics (Odor, Color)	Lt. orange, No odor	**Preservatives Used**	HCl, HNO_3, H_2SO_4, NaOH, None
Number of Containers	12	**Sampler Signature**	Philip Campbell

8 metals (D) dissolved FF NTU = 28

WELL DATA

Number of Baffles	0	**Well Cap Dedicated/In Place?**	yes/yes
Well Clear of Weeds/Accessible?	yes / yes	**Fittings/Well Head Condition**	good /
Pad/Casing Quality	No pad	**Lock Condition**	good

2.0	1456	40	16.0	5.68	93.1	5.03	94.3	>1000	16.18
2.25	1501	45	16.1	5.68	94.9	5.02	93.8	>1000	16.20
2.50	1506	50	16.1	5.68	94.8	5.01	93.9	>1000	16.23

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-3
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, 40's
DATE & TIME	12-11-17/15:20	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	~~Peristaltic Pump~~ Low Flow Bladder	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	28.00	**SAMPLING EQUIPMENT**	~~Bailer~~ & bladder pump
DEPTH TO WATER (feet)	9.85	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (Inches)	1	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	18.15	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	1.15	**EQUIPMENT BLANK COLLECTED?**	NA

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU	DTW
0	15:30	0	15.7	5.13	213.3	1.82	116.0	>1000	10.5
0.15	1535	5	15.8	5.31	212.3	1.55	102.4	>1000	10.80
0.40	1540	10	15.7	5.36	208.7	1.42	101.6	>1000	10.81
0.60	15:45	15	15.7	5.35	205.7	1.46	103.1	317	10.81
0.85	1550	20	15.6	5.35	205.2	1.45	103.4	87.6	10:81
1.00	1555	25	15.7	5.34	205.5	1.59	104.0	~~48.6~~	
1.15	1600	30	15.7	5.35	205.1	1.59	103.3	46.2	

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
1.15	1610	30	15.7	5.35	205.1	1.59	103.3	38.6

Sample Charateristics (Odor, Color)	clear, No odor	**Preservatives Used**	HCl + HNO3, Na thio, H2SO4
Number of Containers	12	**Sampler Signature**	Philip Campbell

@ metals

16.3 NTV = FF Sample

WELL DATA

Number of Baffles	0	**Well Cap Dedicated/In Place?**	yes/yes
Well Clear of Weeds/Accessible?	yes/yes	**Fittings/Well Head Condition**	good
Pad/Casing Quality	No pad	**Lock Condition**	good

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Pres Chk

Report to: **Philip Campbell**

Email To: **mjohnson@cecinc.com,pcampbell@cecinc.com,kcl**

Project Description: **EWS Landfill**

City/State Collected:

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **142-059**

Lab Project # **CEC-142-059**

Collected by (print): Philip Campbell

Site/Facility ID #

P.O. #

Collected by (signature): Philip Campbell
Immediately Packed on Ice N ___ Y ___

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day
Date Results Needed

Quote #

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALK 125mlHDPE-NoPres	Bromide,Cl,F,NO3,SO4 125mlHDPE-NoPres	COD 250mlHDPE-H2SO4	COLLERT Microbiological	Diss. Metals 250mlHDPE-HNO3	Diss. Metals 250mlHDPE-NoPres	NH3 125mlHDPE-H2SO4	SV8011 40mlClr-NaThio	Total Metals + Hard 250mlHDPE-HNO3 *	Total Metals +Hard 250mlHDPE-HNO3 *	Remarks	Sample # (lab only)
MW-1	Grab	GW	—	12-11-17	1100	12	X	X	X		X		X	X	X			
~~MW-3~~		GW				12	X	X	X		X		X	X	X		No Sample	
MW-4		GW	—	12-11-17	1700	12	X	X	X		X		X	X		X		
MW-5		GW	—		1210	14	X	X	X	X	X	X	X	X	X			
TMW-1		GW	—		13:45	12	X	X	X		X		X	X	X			
TMW-2		GW	—		15:15	12	X	X	X		X		X	X		X		
TMW-3		GW	—		1610	12	X	X	X		X		X	X		X		
DUPLICATE		GW	—		—	12	X	X	X		X		X	X				
FIELD BLANK		GW	—		14:35	12	X	X	X		X		X	X	X			
TRIP BLANK		GW	—	—	—	1												

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Dissolved metals are field filtered and preserved
Total + Dissolved Metals = App I, + Boron, Ca, Fe, Mg, Mn, K, Na

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking #

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Philip Campbell	12-12-17			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Chain of Custody Page 1 of 2

ESC LABORATORIES
a subsidiary of Accutest
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L #

Table #

Acctnum: **CEC**
Template:**T128177**
Prelogin: **P628684**
TSR: **341 - John Hawkins**
PB: 11-29-17 CM

Shipped Via: **Courier**

Civil & Environmental Consultants - TN 325 Seaboard Lane, Suite 170	Billing Information: Dr. Kevin Wolfe 325 Seaboard Lane, Suite 170 Franklin, TN 37067	Pres Chk
Report to: Philip Campbell	Email To: mjohnson@cecinc.com,pcampbell@cecinc.com,kcl	

Project Description: EWS Landfill		City/State Collected:
Phone: 615-333-7797 Fax: 615-333-7751	Client Project # 142-059	Lab Project # CEC-142-059
Collected by (print): Philip Campbell	Site/Facility ID #	P.O. # Quote #
Collected by (signature): Immediately Packed on Ice N ___ Y ✓	*Rush?* (Lab MUST Be Notified) ___ Same Day ___ Five Day ___ Next Day ___ 5 Day (Rad Only) ___ Two Day ___ 10 Day (Rad Only) ___ Three Day Date Results Needed	

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Total Metals+ Hard 250mlHDPE-HNO3 *	V8260AP1 40mlAmb-HCl	V8260AP1 40mlAmb-HCl-Blk	Remarks	Sample # (lab only)
MW-1	Grab	GW	—	12-11-17	1100	12		X			
~~MW-3~~		~~GW~~				~~12~~		X		No Samp !	
MW-4		GW	—	12-11-17	1700	12		X			
MW-5		GW	—		1210	14		X			
TMW-1		GW	—		1345	12		X			
TMW-2		GW	—		1515	12		X			
TMW-3		GW	—		1610	12		X			
DUPLICATE		GW	—		—	12	X	X			
FIELD BLANK		GW	—	↓	1435	12		X			
TRIP BLANK		GW	—	—	—	1			X		

Analysis / Container / Preservative

Chain of Custody Page 2 of 2

ESC LABORATORY SCIENCES
a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L #

Table #

Acctnum: CEC
Template: T128177
Prelogin: P628684
TSR: 341 - John Hawkins
PB: 11-29-17 CM

Shipped Via: Courier

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Dissolved metals are field filtered and preserved

Total & Dissolved Metals = Ag, Al, As, Boron, Ca, Fe, Mg, Mn, K, Na

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Philip Campbell	12-12-17			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:

If preservation required by Login: Date/Time

Hold: Condition: NCF / OK

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	IWC-L
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, low 40's, windy
DATE & TIME	12-D-17/ 10:15	**EVENT FREQUENCY**	~~Grab~~ Quarterly
PURGE METHOD	Grab	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	NA	**SAMPLING EQUIPMENT**	~~Bailer~~ Grab
DEPTH TO WATER (feet)	NA	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	NA	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	NA	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	NA	**EQUIPMENT BLANK COLLECTED?**	No

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
—	10:15	—	9.0	3.60	69,267	3.20	271.1	50.4

Sample Charateristics (Odor, Color)	Clear, No odor	**Preservatives Used**	HCl, HNO_3, H_2SO_4, NaOH
Number of Containers	12	**Sampler Signature**	Philip J. Campbell

* Dissolved metals - Lab filtered sample

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 329 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	APWC-L (AWC-L)
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	1C, 40's, windy
DATE & TIME	12-12-17/10:45	**EVENT FREQUENCY**	~~Grab~~ Quarterly
PURGE METHOD	Grab	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	NA	**SAMPLING EQUIPMENT**	~~Bailer~~ Grab
DEPTH TO WATER (feet)	NA	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	NA	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	NA	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	NA	**EQUIPMENT BLANK COLLECTED?**	No

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
—	10:45	—	50.4	9.03	498,184	0.13	-23.8	10.2

Sample Charaterlstics (Odor, Color)	Clear, No odor	**Preservatives Used**	HCl, HNO_3, H_2SO_4, NaOH, None
Number of Containers	12 12	**Sampler Signature**	Philip Campbell

*Dissolved Metals - Lab Filtered sample.

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Pres Chk

Report to: **Philip Campbell**

Email To: **mjohnson@cecinc.com,pcampbell@cecinc.com,kcl**

Project Description: **EWS Landfill**

City/State Collected:

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **142-059**

Lab Project # **CEC-142-059**

Collected by (print): Philip Campbell

Site/Facility ID #

P.O. #

Collected by (signature): Phil Campbell

Immediately Packed on Ice N___ Y✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day
Date Results Needed

Quote #

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALK 125mlHDPE-NoPres	Bromide,Cl,F,NO3,SO4 125mlHDPE-NoPres	COD 250mlHDPE-H2SO4	COLILERT Microbiological	~~Diss. Metals 250mlHDPE-HNO3~~	Diss. Metals 250mlHDPE-NoPres	NH3 125mlHDPE-H2SO4	SV8011 40mlClr-NaThio	Total Metals + Hard 250mlHDPE-HNO3	Total Metals +Hard 250mlHDPE-HNO3	Remarks	Sample # (lab only)
~~EQUIPMENT BLANK~~		GW				12	X	X	X		X		X	X	X			
~~Grab~~																		
IWC-L	Grab	W	—	12-12-17	10:15	12	X	X	X			X	X	X	X			
AWC-L	Grab	W	—	12-12-17	10:45	12	X	X	X			X	X	X	X			

Chain of Custody Page 1 of 1

ESC LABORATORIES
a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L #

Table #

Acctnum: **CEC**
Template: **T128177**
Prelogin: **P628684**
TSR: **341 - John Hawkins**
PB: 11-29-17 CM

Shipped Via: **Courier**

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Dissolved metals are ~~field filtered and preserved~~ Unpreserved.
Total + Dissolved Metals = Appl + Ca, Mg, Mn, K, Fe, Na
*Leachate samples high conductivity use caution
pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	If preservation required by Login: Date/Time
Phil Campbell	12-12-17	18:00			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:	Hold: / Condition: NCF / OK

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Pres Chk

Report to: **Philip Campbell**

Email To: **mjohnson@cecinc.com,pcampbell@cecinc.com,kcl**

Project Description: **EWS Landfill**

City/State Collected:

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **142-059**

Lab Project # **CEC-142-059**

Collected by (print): Philip Campbell

Site/Facility ID #

P.O. #

Collected by (signature): Philip Campbell

Immediately Packed on Ice N ___ Y V

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Total Metals+ Hard 250mlHDPE-HNO3	V8260AP1 40mlAmb-HCl	V8260AP1 40mlAmb-HCl-Blk								Remarks	Sample # (lab only)
~~EQUIPMENT BLANK~~		GW				12		X										
EWC-L	Grab	W	—	12-12-17	10:15			X										
AWC-L	Grab	W	—	12-12-17	10:45			X										

Analysis / Container / Preservative

Chain of Custody Page 2 of 2

ESC LABORATORY SCIENCES
a subsidiary of Accelerated

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L #

Table #

Acctnum: **CEC**
Template: **T128177**
Prelogin: **P628684**
TSR: **341 - John Hawkins**
PB: 11-29-17 CM

Shipped Via: **Courier**

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Dissolved metals are ~~field filtered and preserved~~ Unpreserved
Total + Dissolved Metals = App. I + Ca, Mg, Mn, K, Boron, Na, Fe
(* use caution) samples highly conductive!!

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Philip Campbell	12-12-17	1800		
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:
				If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:
				Hold: / Condition: NCF / OK

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-3 (Re-Sample)
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC
DATE & TIME	12-13-17 / 15:00 / 12-14-17 16:00	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	~~Peristaltic Pump~~ Bailer	**FIELD REPRESENTATIVE**	~~Philip Campbell~~ Cooper Dunn / Philip Campbell
TOTAL WELL DEPTH (feet)	27.00	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	19.98	**IS SAMPLE EQUIPMENT DEDICATED?**	~~No~~ Yes, not used for re-sample
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	~~No~~ No
WATER COLUMN (feet)	7.02	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	3.5	**EQUIPMENT BLANK COLLECTED?**	No

PURGE INFORMATION – Cooper Dunn

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
1.25 ~~0~~	16:00	0	15.03	6.24	429	6.55	84	>1000
2.5 ~~1.25~~	16:03	3	17.79	5.03	406	4.85	193	>1000
3.75 ~~2.5~~	16:06	6	18.37	5.88	399	4.72	206	371
~~3.75~~								

SAMPLE DATA – Next Day – 12-14-17

12-14-17

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
3.75	1600	-	14.2	5.42	529	3.25	93.4	23.0

Sample Charateristics (Odor, Color)	Clear, No odor	**Preservatives Used**	HCl, HNO_3, NaThi, H_2SO_4
Number of Containers	12	**Sampler Signature**	Philip A. Campbell

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	yes
Well Clear of Weeds/Accessible?	yes/yes	**Fittings/Well Head Condition**	good/good
Pad/Casing Quality	good/ good	**Lock Condition**	good

Civil & Environmental Consultants - TN 325 Seaboard Lane, Suite 170	Billing Information: Dr. Kevin Wolfe 325 Seaboard Lane, Suite 170 Franklin, TN 37067	Pres Chk
Report to: Philip Campbell	Email To: pcampbell@cecinc.com	
Project Description: EWS Camden Class 2 Landfill	City/State Collected:	
Phone: 615-333-7797 Fax: 615-333-7751	Client Project # 171-873	Lab Project # CEC-EWS CAMDEN LF
Collected by (print): Philip Campbell	Site/Facility ID # CAMDEN, TN	P.O. #
Collected by (signature): Phil J. Campbell Immediately Packed on Ice N ___ Y ✓	Rush? (Lab MUST Be Notified) ___ Same Day ___ Five Day ___ Next Day ___ 5 Day (Rad Only) ___ Two Day ___ 10 Day (Rad Only) ___ Three Day	Quote # Date Results Needed

Chain of Custody Page 1 of 1

ESC LAB SCIENCES a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L #
Table #
Acctnum: CEC
Template: T130822
Prelogin: P631277
TSR: 341 - John Hawkins
PB: 12/11/17 G
Shipped Via: Courier

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALK,BR,CL,FL,NO2,NO3 125mlHDPE-NoPres (Contains nitrate preserved)	COD 250mlHDPE-H2SO4	Metals AP1 250mlHDPE-HNO3 *	Metals AP1 Dissolved 250mlHDPE-~~NoPres~~ HNO3 Field Filtered	NH3 125mlHDPE-H2SO4	SV8011 40mlClr-NaThio	V8260AP1 40mlAmb-HCl	Remarks	Sample # (lab only)
~~APWC LEACHATE~~		~~GW~~				~~11~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
~~IWC LEACHATE~~		~~GW~~				~~11~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
MW-3	Grab	GW	–	12-14-17	16:00	12	X	X	X	X	X	X	X		

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other ________

Remarks: Metals = App. I + Al, Boron, Ca, Fe, Mg, Mn, K, Na
Dissolved metals are Field Filtered + preserved

pH ______ Temp ______
Flow ______ Other ______

Samples returned via: __ UPS __ FedEx __ Courier __ ______

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: _NP _Y _N
COC Signed/Accurate: _Y _N
Bottles arrive intact: _Y _N
Correct bottles used: _Y _N
Sufficient volume sent: _Y _N
If Applicable
VOA Zero Headspace: _Y _N
Preservation Correct/Checked: _Y _N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	
Phil J. Campbell	12-15-17	9:00	[signature]		
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:	If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:	Hold: Condition: NCF / OK

ANALYTICAL REPORT

February 02, 2018

Civil & Environmental Consultants - TN

Sample Delivery Group:	L957954
Samples Received:	12/15/2017
Project Number:	171-873
Description:	EWS Camden Class 2 Landfill
Site:	CAMDEN, TN
Report To:	Philip Campbell 325 Seaboard Lane, Suite 170 Franklin, TN 37067

Entire Report Reviewed By:

John Hawkins
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

TABLE OF CONTENTS

Cp: Cover Page 1

Tc: Table of Contents 2

Ss: Sample Summary 3

Cn: Case Narrative 4

Sr: Sample Results 5

MW-3 L957954-01 5

Qc: Quality Control Summary 8

Wet Chemistry by Method 130.1 8

Wet Chemistry by Method 2320 B-2011 9

Wet Chemistry by Method 350.1 10

Wet Chemistry by Method 410.4 11

Wet Chemistry by Method 4500P E-2011 12

Wet Chemistry by Method 9056A 13

Mercury by Method 7470A 15

Metals (ICP) by Method 6010B 17

Metals (ICPMS) by Method 6020 19

Volatile Organic Compounds (GC/MS) by Method 8260B 23

EDB / DBCP by Method 8011 26

Gl: Glossary of Terms 27

Al: Accreditations & Locations 28

Sc: Sample Chain of Custody 29

MW-3 L957954-01 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	12/14/17 16:00	12/15/17 15:08

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1055198	1	12/19/17 13:27	12/19/17 13:27	KK
Wet Chemistry by Method 2320 B-2011	WG1054923	1	12/20/17 19:53	12/20/17 19:53	MCG
Wet Chemistry by Method 350.1	WG1055856	1	12/22/17 14:20	12/22/17 14:20	JER
Wet Chemistry by Method 410.4	WG1054532	1	12/17/17 12:04	12/17/17 14:28	MZ
Wet Chemistry by Method 4500P E-2011	WG1054360	1	12/16/17 11:40	12/16/17 11:40	ER
Wet Chemistry by Method 9056A	WG1054255	1	12/16/17 08:34	12/16/17 08:34	DR
Wet Chemistry by Method 9056A	WG1054255	5	12/16/17 11:55	12/16/17 11:55	DR
Mercury by Method 7470A	WG1054669	1	12/18/17 11:17	12/19/17 12:10	ABL
Mercury by Method 7470A	WG1054673	1	12/18/17 00:39	12/18/17 21:08	EL
Metals (ICP) by Method 6010B	WG1054169	1	12/17/17 19:25	12/18/17 01:07	JDG
Metals (ICP) by Method 6010B	WG1054373	1	12/19/17 09:02	12/19/17 13:42	JDG
Metals (ICPMS) by Method 6020	WG1054376	1	12/19/17 10:55	12/19/17 21:40	JDG
Metals (ICPMS) by Method 6020	WG1054441	1	12/19/17 15:28	12/20/17 13:13	JDG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1054683	1	12/18/17 00:54	12/18/17 00:54	ACG
EDB / DBCP by Method 8011	WG1054733	1	12/18/17 09:11	12/19/17 03:35	HMH

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

John Hawkins
Technical Service Representative

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	127		30.0	1	12/19/2017 13:27	WG1055198

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	12/20/2017 19:53	WG1054923

Sample Narrative:
L957954-01 WG1054923: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	12/22/2017 14:20	WG1055856

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	16.7		10.0	1	12/17/2017 14:28	WG1054532

Wet Chemistry by Method 4500P E-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Phosphate,Ortho	ND	T8	0.0250	1	12/16/2017 11:40	WG1054360

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/16/2017 08:34	WG1054255
Chloride	104		5.00	5	12/16/2017 11:55	WG1054255
Fluoride	0.149		0.100	1	12/16/2017 08:34	WG1054255
Nitrate	5.76		0.100	1	12/16/2017 08:34	WG1054255
Nitrite	ND		0.100	1	12/16/2017 08:34	WG1054255
Sulfate	46.2		5.00	1	12/16/2017 08:34	WG1054255

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/19/2017 12:10	WG1054669
Mercury,Dissolved	ND		0.000200	1	12/18/2017 21:08	WG1054673

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.948		0.200	1	12/19/2017 13:42	WG1054373
Aluminum,Dissolved	ND		0.200	1	12/18/2017 01:07	WG1054169
Barium	0.119		0.00500	1	12/19/2017 13:42	WG1054373
Barium,Dissolved	0.112		0.00500	1	12/18/2017 01:07	WG1054169
Boron	ND		0.200	1	12/19/2017 13:42	WG1054373
Boron,Dissolved	ND		0.200	1	12/18/2017 01:07	WG1054169
Chromium	ND		0.0100	1	12/19/2017 13:42	WG1054373
Chromium,Dissolved	ND		0.0100	1	12/18/2017 01:07	WG1054169

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Cobalt	ND		0.0100	1	12/19/2017 13:42	WG1054373
Cobalt,Dissolved	ND		0.0100	1	12/18/2017 01:07	WG1054169
Nickel	ND		0.0100	1	12/19/2017 13:42	WG1054373
Nickel,Dissolved	ND		0.0100	1	12/18/2017 01:07	WG1054169
Silver	ND		0.00500	1	12/19/2017 13:42	WG1054373
Silver,Dissolved	ND		0.00500	1	12/18/2017 01:07	WG1054169
Vanadium	ND		0.0200	1	12/19/2017 13:42	WG1054373
Vanadium,Dissolved	ND		0.0200	1	12/18/2017 01:07	WG1054169

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum,Dissolved	ND		0.100	1	12/20/2017 13:13	WG1054441
Antimony	ND		0.00200	1	12/19/2017 21:40	WG1054376
Antimony,Dissolved	ND		0.00200	1	12/20/2017 13:13	WG1054441
Arsenic	ND		0.00200	1	12/19/2017 21:40	WG1054376
Arsenic,Dissolved	ND		0.00200	1	12/20/2017 13:13	WG1054441
Beryllium	ND		0.00200	1	12/19/2017 21:40	WG1054376
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 13:13	WG1054441
Cadmium	0.00659		0.00100	1	12/19/2017 21:40	WG1054376
Cadmium,Dissolved	0.00733		0.00100	1	12/20/2017 13:13	WG1054441
Calcium	26.9		1.00	1	12/19/2017 21:40	WG1054376
Calcium,Dissolved	26.3		1.00	1	12/20/2017 13:13	WG1054441
Copper	0.00583		0.00500	1	12/19/2017 21:40	WG1054376
Copper,Dissolved	0.00706		0.00500	1	12/20/2017 13:13	WG1054441
Iron	0.239		0.100	1	12/19/2017 21:40	WG1054376
Iron,Dissolved	ND		0.100	1	12/20/2017 13:13	WG1054441
Lead	ND		0.00200	1	12/19/2017 21:40	WG1054376
Lead,Dissolved	ND		0.00200	1	12/20/2017 13:13	WG1054441
Magnesium	12.8		1.00	1	12/19/2017 21:40	WG1054376
Magnesium,Dissolved	11.7		1.00	1	12/20/2017 13:13	WG1054441
Manganese	0.234		0.00500	1	12/19/2017 21:40	WG1054376
Potassium	22.5		1.00	1	12/19/2017 21:40	WG1054376
Potassium,Dissolved	21.1		1.00	1	12/20/2017 13:13	WG1054441
Selenium	ND		0.00200	1	12/19/2017 21:40	WG1054376
Selenium,Dissolved	ND		0.00200	1	12/20/2017 13:13	WG1054441
Sodium	42.9		1.00	1	12/19/2017 21:40	WG1054376
Sodium,Dissolved	40.7		1.00	1	12/20/2017 13:13	WG1054441
Thallium	ND		0.00200	1	12/19/2017 21:40	WG1054376
Thallium,Dissolved	ND		0.00200	1	12/20/2017 13:13	WG1054441
Zinc	0.159		0.0250	1	12/19/2017 21:40	WG1054376
Zinc,Dissolved	0.0485		0.0250	1	12/20/2017 13:13	WG1054441

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	12/18/2017 00:54	WG1054683
Acrylonitrile	ND		0.0100	1	12/18/2017 00:54	WG1054683
Benzene	ND		0.00100	1	12/18/2017 00:54	WG1054683
Bromochloromethane	ND		0.00100	1	12/18/2017 00:54	WG1054683
Bromodichloromethane	ND		0.00100	1	12/18/2017 00:54	WG1054683
Bromoform	ND		0.00100	1	12/18/2017 00:54	WG1054683
Bromomethane	ND		0.00500	1	12/18/2017 00:54	WG1054683
Carbon disulfide	ND		0.00100	1	12/18/2017 00:54	WG1054683
Carbon tetrachloride	ND		0.00100	1	12/18/2017 00:54	WG1054683

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chlorobenzene	ND		0.00100	1	12/18/2017 00:54	WG1054683
Chlorodibromomethane	ND		0.00100	1	12/18/2017 00:54	WG1054683
Chloroethane	ND		0.00500	1	12/18/2017 00:54	WG1054683
Chloroform	ND		0.00500	1	12/18/2017 00:54	WG1054683
Chloromethane	ND		0.00250	1	12/18/2017 00:54	WG1054683
Dibromomethane	ND		0.00100	1	12/18/2017 00:54	WG1054683
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	12/18/2017 00:54	WG1054683
1,2-Dibromoethane	ND		0.00100	1	12/18/2017 00:54	WG1054683
1,2-Dichlorobenzene	ND		0.00100	1	12/18/2017 00:54	WG1054683
1,4-Dichlorobenzene	ND		0.00100	1	12/18/2017 00:54	WG1054683
trans-1,4-Dichloro-2-butene	ND		0.00250	1	12/18/2017 00:54	WG1054683
1,1-Dichloroethane	ND		0.00100	1	12/18/2017 00:54	WG1054683
1,2-Dichloroethane	ND		0.00100	1	12/18/2017 00:54	WG1054683
1,1-Dichloroethene	ND		0.00100	1	12/18/2017 00:54	WG1054683
cis-1,2-Dichloroethene	ND		0.00100	1	12/18/2017 00:54	WG1054683
trans-1,2-Dichloroethene	ND		0.00100	1	12/18/2017 00:54	WG1054683
1,2-Dichloropropane	ND		0.00100	1	12/18/2017 00:54	WG1054683
cis-1,3-Dichloropropene	ND		0.00100	1	12/18/2017 00:54	WG1054683
trans-1,3-Dichloropropene	ND		0.00100	1	12/18/2017 00:54	WG1054683
Ethylbenzene	ND		0.00100	1	12/18/2017 00:54	WG1054683
2-Hexanone	ND		0.0100	1	12/18/2017 00:54	WG1054683
Iodomethane	ND	J3	0.0100	1	12/18/2017 00:54	WG1054683
2-Butanone (MEK)	ND		0.0100	1	12/18/2017 00:54	WG1054683
Methylene Chloride	ND		0.00500	1	12/18/2017 00:54	WG1054683
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	12/18/2017 00:54	WG1054683
Styrene	ND		0.00100	1	12/18/2017 00:54	WG1054683
1,1,1,2-Tetrachloroethane	ND		0.00100	1	12/18/2017 00:54	WG1054683
1,1,2,2-Tetrachloroethane	ND		0.00100	1	12/18/2017 00:54	WG1054683
Tetrachloroethene	ND		0.00100	1	12/18/2017 00:54	WG1054683
Toluene	ND		0.00100	1	12/18/2017 00:54	WG1054683
1,1,1-Trichloroethane	ND		0.00100	1	12/18/2017 00:54	WG1054683
1,1,2-Trichloroethane	ND		0.00100	1	12/18/2017 00:54	WG1054683
Trichloroethene	ND		0.00100	1	12/18/2017 00:54	WG1054683
Trichlorofluoromethane	ND		0.00500	1	12/18/2017 00:54	WG1054683
1,2,3-Trichloropropane	ND		0.00250	1	12/18/2017 00:54	WG1054683
Vinyl acetate	ND	J4	0.0100	1	12/18/2017 00:54	WG1054683
Vinyl chloride	ND		0.00100	1	12/18/2017 00:54	WG1054683
Xylenes, Total	ND		0.00300	1	12/18/2017 00:54	WG1054683
(S) Toluene-d8	*111*		*80.0-120*		*12/18/2017 00:54*	WG1054683
(S) Dibromofluoromethane	*88.6*		*76.0-123*		*12/18/2017 00:54*	WG1054683
(S) a,a,a-Trifluorotoluene	*102*		*80.0-120*		*12/18/2017 00:54*	WG1054683
(S) 4-Bromofluorobenzene	*105*		*80.0-120*		*12/18/2017 00:54*	WG1054683

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	12/19/2017 03:35	WG1054733
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	12/19/2017 03:35	WG1054733

Method Blank (MB)

(MB) R3274141-1 12/19/17 13:02

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	3.81	J	1.43	30.0

L956644-03 Original Sample (OS) • Duplicate (DUP)

(OS) L956644-03 12/19/17 13:10 • (DUP) R3274141-4 12/19/17 13:12

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	ND	27.5	1	0		20

L958001-02 Original Sample (OS) • Duplicate (DUP)

(OS) L958001-02 12/19/17 13:29 • (DUP) R3274141-7 12/19/17 13:30

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	63.9	64.6	1	1.09		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274141-2 12/19/17 13:03 • (LCSD) R3274141-3 12/19/17 13:04

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	158	157	105	105	85-115			0.635	20

L957740-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957740-01 12/19/17 13:23 • (MS) R3274141-5 12/19/17 13:24 • (MSD) R3274141-6 12/19/17 13:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	156	232	234	50.7	52	1	80-120	E J6	E J6	0.858	20

L957873-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957873-01 12/20/17 17:40 • (DUP) R3274693-1 12/20/17 17:47

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	175	175	1	0.122		20

Sample Narrative:
OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

L957991-03 Original Sample (OS) • Duplicate (DUP)

(OS) L957991-03 12/20/17 21:24 • (DUP) R3274693-6 12/20/17 21:31

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	20.5	22.3	1	8.53		20

Sample Narrative:
OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274693-2 12/20/17 18:19 • (LCSD) R3274693-5 12/20/17 20:12

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Alkalinity	100	105	99.6	105	99.6	85.0-115			5.39	20

Sample Narrative:
LCS: Endpoint pH 4.5
LCSD: Endpoint pH 4.5

Method Blank (MB)

(MB) R3275380-1 12/22/17 13:37

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ammonia Nitrogen	U		0.0317	0.100

L957954-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957954-01 12/22/17 14:20 • (DUP) R3275380-5 12/22/17 14:22

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.000	1	0		10

L957863-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957863-01 12/22/17 15:59 • (DUP) R3275380-9 12/22/17 16:00

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	1.94	1.76	1	9.66		10

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3275380-2 12/22/17 13:39 • (LCSD) R3275380-3 12/22/17 13:40

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	7.50	7.62	7.76	102	104	90-110			1.9	20

L957863-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L957863-02 12/22/17 13:48 • (MS) R3275380-4 12/22/17 13:50

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	5.00	ND	4.97	97.8	1	90-110	

L957969-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957969-01 12/22/17 14:23 • (MS) R3275380-6 12/22/17 14:25 • (MSD) R3275380-7 12/22/17 14:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	5.00	2.23	7.16	7.06	98.5	96.5	1	90-110			1.42	20

Method Blank (MB)

(MB) R3273640-1 12/17/17 14:21

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
COD	U		3	10.0

L957545-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957545-01 12/17/17 14:22 • (DUP) R3273640-4 12/17/17 14:23

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	20.3	20.3	1	0		20

L958164-03 Original Sample (OS) • Duplicate (DUP)

(OS) L958164-03 12/17/17 14:28 • (DUP) R3273640-7 12/17/17 14:29

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	77.3	81.0	1	4.71		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273640-2 12/17/17 14:21 • (LCSD) R3273640-3 12/17/17 14:21

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
COD	242	233	227	96.4	93.6	90-110			2.93	20

L957918-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957918-02 12/17/17 14:26 • (MS) R3273640-5 12/17/17 14:26 • (MSD) R3273640-6 12/17/17 14:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
COD	400	25.2	440	427	104	100	1	80-120			3.17	20

Method Blank (MB)

(MB) R3273535-1 12/16/17 11:08

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Phosphate,Ortho	U		0.009	0.0250

L958078-01 Original Sample (OS) • Duplicate (DUP)

(OS) L958078-01 12/16/17 11:39 • (DUP) R3273535-4 12/16/17 11:39

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Phosphate,Ortho	0.0220	0.0230	1	4.44	J	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273535-2 12/16/17 11:09 • (LCSD) R3273535-3 12/16/17 11:09

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Phosphate,Ortho	0.750	0.796	0.800	106	107	85-115			0.501	20

L957954-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957954-01 12/16/17 11:40 • (MS) R3273535-5 12/16/17 11:42 • (MSD) R3273535-6 12/16/17 11:47

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Phosphate,Ortho	0.500	ND	0.502	0.505	100	101	1	80-120			0.596	20

Method Blank (MB)

(MB) R3273609-1 12/16/17 06:41

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.079	1.00
Chloride	0.112	J	0.0519	1.00
Fluoride	U		0.0099	0.100
Nitrate	U		0.0227	0.100
Nitrite	U		0.0277	0.100
Sulfate	U		0.0774	5.00

L957993-03 Original Sample (OS) • Duplicate (DUP)

(OS) L957993-03 12/16/17 11:26 • (DUP) R3273609-6 12/16/17 10:43

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	U	0.000	1	0		15
Fluoride	U	0.000	1	0		15
Nitrate	U	0.000	1	0		15
Nitrite	0.0325	0.000	1	200	P1	15

L957953-02 Original Sample (OS) • Duplicate (DUP)

(OS) L957953-02 12/16/17 20:45 • (DUP) R3273609-7 12/16/17 20:59

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0		15
Chloride	11.7	11.6	1	0.686		15
Fluoride	0.768	0.756	1	1.56		15
Nitrate	0.218	0.221	1	1.14		15
Nitrite	ND	0.000	1	0		15
Sulfate	17.2	17.2	1	0.376		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273609-2 12/16/17 06:56 • (LCSD) R3273609-3 12/16/17 07:10

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromide	40.0	40.0	39.6	99.9	99.1	80-120			0.859	15
Chloride	40.0	39.7	39.3	99.3	98.4	80-120			0.972	15
Fluoride	8.00	8.06	7.97	101	99.6	80-120			1.15	15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273609-2 12/16/17 06:56 • (LCSD) R3273609-3 12/16/17 07:10

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Nitrate	8.00	8.15	8.07	102	101	80-120			1.03	15
Nitrite	8.00	7.98	7.92	99.7	99	80-120			0.744	15
Sulfate	40.0	40.1	39.7	100	99.3	80-120			1.01	15

L957993-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957993-01 12/16/17 09:02 • (MS) R3273609-4 12/16/17 09:16 • (MSD) R3273609-5 12/16/17 09:31

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	U	16.1	16.3	32.2	32.6	1	80-120	J6	J6	1.18	15
Fluoride	5.00	8.18	12.6	12.6	88.8	87.8	1	80-120	E	E	0.414	15
Nitrate	5.00	0.497	5.24	5.25	94.8	95.1	1	80-120			0.303	15
Nitrite	5.00	0.122	5.16	5.19	101	101	1	80-120			0.559	15

L957953-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L957953-02 12/16/17 20:45 • (MS) R3273609-8 12/16/17 21:14

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	49.1	98.2	1	80-120	
Chloride	50.0	11.7	62.4	101	1	80-120	
Fluoride	5.00	0.768	5.86	102	1	80-120	
Nitrate	5.00	0.218	5.35	103	1	80-120	
Nitrite	5.00	ND	4.95	98.9	1	80-120	
Sulfate	50.0	17.2	67.3	100	1	80-120	

Method Blank (MB)

(MB) R3274139-1 12/19/17 11:11

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.000049	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274139-2 12/19/17 11:13 • (LCSD) R3274139-3 12/19/17 11:15

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	0.00302	0.00305	101	102	80-120			0.824	20

L957873-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957873-03 12/19/17 11:18 • (MS) R3274139-4 12/19/17 11:20 • (MSD) R3274139-5 12/19/17 11:22

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	U	0.00299	0.00205	99.8	68.2	1	75-125		J3 J6	37.6	20

Method Blank (MB)

(MB) R3274007-1 12/18/17 20:00

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury,Dissolved	U		0.000049	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274007-2 12/18/17 20:58 • (LCSD) R3274007-3 12/18/17 21:05

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	0.00302	0.00309	101	103	80-120			2.24	20

L957954-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957954-01 12/18/17 21:08 • (MS) R3274007-4 12/18/17 21:10 • (MSD) R3274007-5 12/18/17 21:12

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	ND	0.00314	0.00313	105	104	1	75-125			0.0766	20

Method Blank (MB)

(MB) R3273681-1 12/18/17 00:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum,Dissolved	0.0375	J	0.035	0.200
Barium,Dissolved	U		0.0017	0.00500
Boron,Dissolved	U		0.0126	0.200
Chromium,Dissolved	U		0.0014	0.0100
Cobalt,Dissolved	U		0.0023	0.0100
Nickel,Dissolved	U		0.0049	0.0100
Silver,Dissolved	U		0.0028	0.00500
Vanadium,Dissolved	0.0057	J	0.0024	0.0200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273681-2 12/18/17 00:22 • (LCSD) R3273681-3 12/18/17 00:24

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	10.0	10.4	10.7	104	107	80-120			3.38	20
Barium,Dissolved	1.00	1.05	1.08	105	108	80-120			2.25	20
Boron,Dissolved	1.00	1.02	1.00	102	100	80-120			1.24	20
Chromium,Dissolved	1.00	1.03	1.05	103	105	80-120			2.48	20
Cobalt,Dissolved	1.00	1.05	1.07	105	107	80-120			1.94	20
Nickel,Dissolved	1.00	1.04	1.06	104	106	80-120			2.27	20
Silver,Dissolved	0.200	0.180	0.183	89.9	91.3	80-120			1.55	20
Vanadium,Dissolved	1.00	1.03	1.06	103	106	80-120			2.8	20

L957993-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957993-01 12/18/17 00:27 • (MS) R3273681-5 12/18/17 00:32 • (MSD) R3273681-6 12/18/17 00:35

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	10.0	0.105	10.8	10.8	107	107	1	75-125			0.389	20
Barium,Dissolved	1.00	0.0285	1.07	1.07	104	104	1	75-125			0.505	20
Boron,Dissolved	1.00	0.631	1.67	1.71	104	108	1	75-125			2.3	20
Chromium,Dissolved	1.00	0.0272	1.06	1.05	103	102	1	75-125			0.613	20
Cobalt,Dissolved	1.00	0.00429	1.14	1.14	114	113	1	75-125			0.24	20
Nickel,Dissolved	1.00	U	1.12	1.12	112	112	1	75-125			0.25	20
Silver,Dissolved	0.200	U	0.197	0.196	98.6	97.9	1	75-125			0.802	20
Vanadium,Dissolved	1.00	0.00632	1.07	1.08	106	107	1	75-125			1.06	20

Method Blank (MB)

(MB) R3274151-1 12/19/17 13:16

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	U		0.035	0.200
Barium	U		0.0017	0.00500
Boron	U		0.0126	0.200
Chromium	U		0.0014	0.0100
Cobalt	U		0.0023	0.0100
Nickel	U		0.0049	0.0100
Silver	U		0.0028	0.00500
Vanadium	U		0.0024	0.0200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274151-2 12/19/17 13:19 • (LCSD) R3274151-3 12/19/17 13:22

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	10.0	9.86	9.81	98.6	98.1	80-120			0.522	20
Barium	1.00	0.998	0.998	99.8	99.8	80-120			0.0183	20
Boron	1.00	0.986	0.979	98.6	97.9	80-120			0.779	20
Chromium	1.00	0.963	0.961	96.3	96.1	80-120			0.225	20
Cobalt	1.00	0.995	0.997	99.5	99.7	80-120			0.123	20
Nickel	1.00	0.982	0.983	98.2	98.3	80-120			0.0986	20
Silver	0.200	0.184	0.183	92.1	91.6	80-120			0.604	20
Vanadium	1.00	0.994	0.986	99.4	98.6	80-120			0.83	20

L957947-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957947-01 12/19/17 13:25 • (MS) R3274151-5 12/19/17 13:32 • (MSD) R3274151-6 12/19/17 13:35

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Barium	1.00	0.0129	0.995	0.989	98.2	97.6	1	75-125			0.657	20
Boron	1.00	0.135	1.13	1.11	99.3	97.4	1	75-125			1.67	20
Chromium	1.00	U	0.967	0.959	96.7	95.9	1	75-125			0.803	20
Cobalt	1.00	U	1.03	1.03	103	103	1	75-125			0.278	20
Nickel	1.00	U	1.02	1.02	102	102	1	75-125			0.142	20
Silver	0.200	U	0.187	0.187	93.5	93.7	1	75-125			0.303	20
Vanadium	1.00	0.00251	0.998	0.982	99.5	98	1	75-125			1.59	20

Method Blank (MB)

(MB) R3274367-1 12/19/17 20:38

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Antimony	U		0.000754	0.00200
Arsenic	U		0.00025	0.00200
Beryllium	U		0.00012	0.00200
Cadmium	U		0.00016	0.00100
Calcium	0.247	J	0.046	1.00
Copper	U		0.00052	0.00500
Lead	U		0.00024	0.00200
Magnesium	0.257	J	0.1	1.00
Manganese	U		0.00025	0.00500
Potassium	0.266	J	0.037	1.00
Selenium	U		0.00038	0.00200
Sodium	0.283	J	0.11	1.00
Thallium	U		0.00019	0.00200
Zinc	0.00521	J	0.00256	0.0250

Method Blank (MB)

(MB) R3274581-1 12/20/17 16:09

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Iron	U		0.015	0.100

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274367-2 12/19/17 20:41 • (LCSD) R3274367-3 12/19/17 20:45

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Antimony	0.0500	0.0503	0.0504	101	101	80-120			0.0503	20
Arsenic	0.0500	0.0498	0.0499	99.6	99.7	80-120			0.151	20
Beryllium	0.0500	0.0450	0.0450	90	90.1	80-120			0.12	20
Cadmium	0.0500	0.0476	0.0483	95.2	96.5	80-120			1.41	20
Calcium	5.00	4.97	4.93	99.4	98.6	80-120			0.831	20
Copper	0.0500	0.0517	0.0518	103	104	80-120			0.131	20
Lead	0.0500	0.0466	0.0472	93.1	94.4	80-120			1.34	20
Magnesium	5.00	5.05	5.00	101	100	80-120			1.1	20
Manganese	0.0500	0.0483	0.0490	96.7	98	80-120			1.38	20
Potassium	5.00	5.09	5.02	102	100	80-120			1.46	20
Selenium	0.0500	0.0459	0.0475	91.8	94.9	80-120			3.33	20
Sodium	5.00	5.22	5.12	104	102	80-120			1.86	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274367-2 12/19/17 20:41 • (LCSD) R3274367-3 12/19/17 20:45

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Thallium	0.0500	0.0472	0.0479	94.4	95.8	80-120			1.49	20
Zinc	0.0500	0.0520	0.0509	104	102	80-120			2.07	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274581-2 12/20/17 16:30 • (LCSD) R3274581-3 12/20/17 16:34

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Iron	5.00	4.99	4.95	99.7	99.1	80-120			0.67	20

L957967-14 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957967-14 12/19/17 20:49 • (MS) R3274367-5 12/19/17 20:57 • (MSD) R3274367-6 12/19/17 21:00

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Antimony	0.0500	ND	0.0509	0.0502	102	100	1	75-125			1.43	20
Arsenic	0.0500	ND	0.0514	0.0509	101	99.5	1	75-125			1.06	20
Beryllium	0.0500	ND	0.0463	0.0461	92	91.6	1	75-125			0.437	20
Cadmium	0.0500	ND	0.0491	0.0484	97.7	96.4	1	75-125			1.36	20
Calcium	5.00	ND	5.03	4.97	99.3	98.1	1	75-125			1.19	20
Copper	0.0500	ND	0.0527	0.0526	102	102	1	75-125			0.116	20
Potassium	5.00	ND	5.13	5.06	102	100	1	75-125			1.22	20
Lead	0.0500	ND	0.0471	0.0472	93.4	93.7	1	75-125			0.292	20
Magnesium	5.00	ND	5.13	5.06	103	101	1	75-125			1.26	20
Manganese	0.0500	ND	0.0508	0.0500	99.7	98.2	1	75-125			1.51	20
Selenium	0.0500	ND	0.0479	0.0454	95.7	90.7	1	75-125			5.39	20
Sodium	5.00	ND	5.39	5.29	105	103	1	75-125			1.83	20
Thallium	0.0500	ND	0.0481	0.0478	95.6	95	1	75-125			0.636	20
Zinc	0.0500	ND	0.0520	0.0558	104	112	1	75-125			7.05	20

L957967-14 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957967-14 12/20/17 16:37 • (MS) R3274581-4 12/20/17 16:41 • (MSD) R3274581-5 12/20/17 16:45

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Iron	5.00	ND	5.09	5.03	102	101	1	75-125			1.15	20

Method Blank (MB)

(MB) R3274522-1 12/20/17 12:46

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum,Dissolved	0.0134	J	0.00515	0.100
Antimony,Dissolved	U		0.000754	0.00200
Arsenic,Dissolved	U		0.00025	0.00200
Beryllium,Dissolved	U		0.00012	0.00200
Cadmium,Dissolved	U		0.00016	0.00100
Calcium,Dissolved	U		0.046	1.00
Copper,Dissolved	U		0.00052	0.00500
Iron,Dissolved	U		0.015	0.100
Lead,Dissolved	U		0.00024	0.00200
Magnesium,Dissolved	U		0.1	1.00
Potassium,Dissolved	U		0.037	1.00
Selenium,Dissolved	U		0.00038	0.00200
Sodium,Dissolved	U		0.11	1.00
Thallium,Dissolved	U		0.00019	0.00200
Zinc,Dissolved	U		0.00256	0.0250

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274522-2 12/20/17 12:50 • (LCSD) R3274522-3 12/20/17 12:54

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	4.72	4.74	94.4	94.7	80-120			0.374	20
Antimony,Dissolved	0.0500	0.0572	0.0573	114	115	80-120			0.203	20
Arsenic,Dissolved	0.0500	0.0488	0.0494	97.6	98.8	80-120			1.13	20
Beryllium,Dissolved	0.0500	0.0464	0.0464	92.8	92.7	80-120			0.0341	20
Cadmium,Dissolved	0.0500	0.0485	0.0486	97	97.1	80-120			0.0818	20
Calcium,Dissolved	5.00	4.91	4.94	98.1	98.8	80-120			0.726	20
Copper,Dissolved	0.0500	0.0497	0.0501	99.3	100	80-120			0.908	20
Iron,Dissolved	5.00	4.96	4.97	99.2	99.5	80-120			0.303	20
Lead,Dissolved	0.0500	0.0489	0.0492	97.8	98.4	80-120			0.574	20
Magnesium,Dissolved	5.00	4.80	4.81	96	96.3	80-120			0.288	20
Potassium,Dissolved	5.00	4.68	4.69	93.6	93.8	80-120			0.235	20
Selenium,Dissolved	0.0500	0.0481	0.0488	96.2	97.7	80-120			1.58	20
Sodium,Dissolved	5.00	5.03	5.00	101	100	80-120			0.545	20
Thallium,Dissolved	0.0500	0.0487	0.0488	97.5	97.5	80-120			0.0422	20
Zinc,Dissolved	0.0500	0.0511	0.0510	102	102	80-120			0.17	20

L958174-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L958174-06 12/20/17 12:57 • (MS) R3274522-5 12/20/17 13:05 • (MSD) R3274522-6 12/20/17 13:09

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Antimony,Dissolved	0.0500	U	0.0575	0.0574	115	115	1	75-125			0.14	20
Arsenic,Dissolved	0.0500	0.00141	0.0507	0.0505	98.6	98.2	1	75-125			0.413	20
Beryllium,Dissolved	0.0500	U	0.0479	0.0470	95.8	94	1	75-125			1.88	20
Cadmium,Dissolved	0.0500	U	0.0497	0.0494	99.4	98.7	1	75-125			0.657	20
Copper,Dissolved	0.0500	0.000873	0.0495	0.0489	97.3	96	1	75-125			1.3	20
Lead,Dissolved	0.0500	U	0.0497	0.0490	99.3	98	1	75-125			1.37	20
Selenium,Dissolved	0.0500	0.000472	0.0483	0.0491	95.7	97.2	1	75-125			1.56	20
Thallium,Dissolved	0.0500	U	0.0489	0.0485	97.7	97	1	75-125			0.708	20
Zinc,Dissolved	0.0500	U	0.0518	0.0513	104	103	1	75-125			0.926	20

Method Blank (MB)

(MB) R3273890-3 12/17/17 23:12

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acetone	U		0.0100	0.0500
Acrylonitrile	U		0.00187	0.0100
Benzene	U		0.000331	0.00100
Bromodichloromethane	U		0.000380	0.00100
Bromochloromethane	U		0.000520	0.00100
Bromoform	U		0.000469	0.00100
Bromomethane	U		0.000866	0.00500
Carbon disulfide	U		0.000275	0.00100
Carbon tetrachloride	U		0.000379	0.00100
Chlorobenzene	U		0.000348	0.00100
Chlorodibromomethane	U		0.000327	0.00100
Chloroethane	U		0.000453	0.00500
Chloroform	U		0.000324	0.00500
Chloromethane	U		0.000276	0.00250
1,2-Dibromo-3-Chloropropane	U		0.00133	0.00500
1,2-Dibromoethane	U		0.000381	0.00100
Dibromomethane	U		0.000346	0.00100
1,2-Dichlorobenzene	U		0.000349	0.00100
1,4-Dichlorobenzene	U		0.000274	0.00100
trans-1,4-Dichloro-2-butene	U		0.000866	0.00250
1,1-Dichloroethane	U		0.000259	0.00100
1,2-Dichloroethane	U		0.000361	0.00100
1,1-Dichloroethene	U		0.000398	0.00100
cis-1,2-Dichloroethene	U		0.000260	0.00100
trans-1,2-Dichloroethene	U		0.000396	0.00100
1,2-Dichloropropane	U		0.000306	0.00100
cis-1,3-Dichloropropene	U		0.000418	0.00100
trans-1,3-Dichloropropene	U		0.000419	0.00100
Ethylbenzene	U		0.000384	0.00100
2-Hexanone	U		0.00382	0.0100
Iodomethane	U		0.00171	0.0100
2-Butanone (MEK)	U		0.00393	0.0100
Methylene Chloride	U		0.00100	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.00214	0.0100
Styrene	U		0.000307	0.00100
1,1,1,2-Tetrachloroethane	U		0.000385	0.00100
1,1,2,2-Tetrachloroethane	U		0.000130	0.00100
Tetrachloroethene	U		0.000372	0.00100
Toluene	U		0.000412	0.00100
1,1,1-Trichloroethane	U		0.000319	0.00100

Method Blank (MB)

(MB) R3273890-3 12/17/17 23:12

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
1,1,2-Trichloroethane	U		0.000383	0.00100
Trichloroethene	U		0.000398	0.00100
Trichlorofluoromethane	U		0.00120	0.00500
1,2,3-Trichloropropane	U		0.000807	0.00250
Vinyl chloride	U		0.000259	0.00100
Xylenes, Total	U		0.00106	0.00300
Vinyl acetate	U		0.00163	0.0100
(S) Toluene-d8	*110*			*80.0-120*
(S) Dibromofluoromethane	*88.2*			*76.0-123*
(S) 4-Bromofluorobenzene	*107*			*80.0-120*
(S) a,a,a-Trifluorotoluene	*104*			*80.0-120*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273890-1 12/17/17 22:11 • (LCSD) R3273890-2 12/17/17 22:31

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	0.125	0.127	0.122	102	97.5	10.0-160			4.16	23
Acrylonitrile	0.125	0.124	0.122	99.2	97.5	60.0-142			1.78	20
Benzene	0.0250	0.0217	0.0219	86.9	87.7	69.0-123			0.978	20
Bromodichloromethane	0.0250	0.0250	0.0251	99.9	100	76.0-120			0.399	20
Bromochloromethane	0.0250	0.0244	0.0239	97.4	95.7	76.0-122			1.75	20
Bromoform	0.0250	0.0268	0.0264	107	106	67.0-132			1.66	20
Bromomethane	0.0250	0.0154	0.0172	61.8	68.6	18.0-160			10.6	20
Carbon disulfide	0.0250	0.0203	0.0206	81.2	82.5	55.0-127			1.62	20
Carbon tetrachloride	0.0250	0.0211	0.0217	84.3	86.9	63.0-122			2.99	20
Chlorobenzene	0.0250	0.0240	0.0247	96.1	98.8	79.0-121			2.80	20
Chlorodibromomethane	0.0250	0.0268	0.0270	107	108	75.0-125			0.626	20
Chloroethane	0.0250	0.0202	0.0205	80.9	82.0	47.0-152			1.31	20
Chloroform	0.0250	0.0217	0.0220	87.0	88.1	72.0-121			1.32	20
Chloromethane	0.0250	0.0222	0.0225	88.7	90.0	48.0-139			1.51	20
1,2-Dibromo-3-Chloropropane	0.0250	0.0297	0.0286	119	114	64.0-127			3.89	20
1,2-Dibromoethane	0.0250	0.0264	0.0260	105	104	77.0-123			1.45	20
Dibromomethane	0.0250	0.0244	0.0243	97.7	97.4	78.0-120			0.377	20
1,2-Dichlorobenzene	0.0250	0.0246	0.0244	98.5	97.7	80.0-120			0.762	20
1,4-Dichlorobenzene	0.0250	0.0235	0.0237	94.0	94.9	77.0-120			0.912	20
trans-1,4-Dichloro-2-butene	0.0250	0.0319	0.0304	127	121	55.0-134			4.83	20
1,1-Dichloroethane	0.0250	0.0223	0.0223	89.1	89.2	70.0-126			0.188	20
1,2-Dichloroethane	0.0250	0.0220	0.0219	88.2	87.8	67.0-126			0.448	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273890-1 12/17/17 22:11 • (LCSD) R3273890-2 12/17/17 22:31

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
1,1-Dichloroethene	0.0250	0.0221	0.0221	88.2	88.5	64.0-129			0.294	20
cis-1,2-Dichloroethene	0.0250	0.0213	0.0211	85.0	84.4	73.0-120			0.760	20
trans-1,2-Dichloroethene	0.0250	0.0222	0.0222	88.8	88.8	71.0-121			0.00581	20
1,2-Dichloropropane	0.0250	0.0242	0.0244	97.0	97.6	75.0-125			0.652	20
cis-1,3-Dichloropropene	0.0250	0.0266	0.0271	106	109	79.0-123			2.01	20
trans-1,3-Dichloropropene	0.0250	0.0263	0.0265	105	106	74.0-127			0.503	20
Ethylbenzene	0.0250	0.0248	0.0251	99.2	100	77.0-120			1.27	20
2-Hexanone	0.125	0.144	0.141	115	112	58.0-147			2.29	20
Iodomethane	0.125	0.0881	0.111	70.5	89.0	57.0-140		J3	23.3	20
2-Butanone (MEK)	0.125	0.128	0.124	102	98.9	37.0-158			3.36	20
Methylene Chloride	0.0250	0.0213	0.0215	85.0	86.1	66.0-121			1.27	20
4-Methyl-2-pentanone (MIBK)	0.125	0.138	0.135	111	108	59.0-143			2.43	20
Styrene	0.0250	0.0264	0.0261	106	105	78.0-124			1.00	20
1,1,1,2-Tetrachloroethane	0.0250	0.0265	0.0274	106	110	75.0-122			3.21	20
1,1,2,2-Tetrachloroethane	0.0250	0.0222	0.0221	89.0	88.2	71.0-122			0.846	20
Tetrachloroethene	0.0250	0.0235	0.0244	93.9	97.5	70.0-127			3.79	20
Toluene	0.0250	0.0238	0.0243	95.1	97.2	77.0-120			2.11	20
1,1,1-Trichloroethane	0.0250	0.0218	0.0224	87.3	89.7	68.0-122			2.70	20
1,1,2-Trichloroethane	0.0250	0.0254	0.0254	102	102	78.0-120			0.0305	20
Trichloroethene	0.0250	0.0248	0.0257	99.2	103	78.0-120			3.56	20
Trichlorofluoromethane	0.0250	0.0205	0.0208	82.1	83.1	56.0-137			1.18	20
1,2,3-Trichloropropane	0.0250	0.0257	0.0251	103	100	72.0-124			2.22	20
Vinyl acetate	0.125	0.0527	0.0563	42.1	45.0	46.0-160	J4	J4	6.62	20
Vinyl chloride	0.0250	0.0222	0.0227	88.7	90.8	64.0-133			2.32	20
Xylenes, Total	0.0750	0.0740	0.0747	98.7	99.6	77.0-120			0.941	20
(S) Toluene-d8				*104*	*104*	*80.0-120*				
(S) Dibromofluoromethane				*89.4*	*89.1*	*76.0-123*				
(S) 4-Bromofluorobenzene				*102*	*102*	*80.0-120*				
(S) a,a,a-Trifluorotoluene				*102*	*101*	*80.0-120*				

Method Blank (MB)

(MB) R3274103-1 12/19/17 00:11

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Ethylene Dibromide	U		0.00000240	0.0000100
1,2-Dibromo-3-Chloropropane	U		0.00000430	0.0000200

L958132-02 Original Sample (OS) • Duplicate (DUP)

(OS) L958132-02 12/19/17 00:56 • (DUP) R3274103-3 12/19/17 00:45

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Ethylene Dibromide	U	0.000	1	0.000		20
1,2-Dibromo-3-Chloropropane	U	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274103-4 12/19/17 02:38 • (LCSD) R3274103-5 12/19/17 04:43

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Ethylene Dibromide	0.000250	0.000223	0.000214	89.1	85.7	60.0-140			3.86	20
1,2-Dibromo-3-Chloropropane	0.000250	0.000236	0.000233	94.4	93.4	60.0-140			1.11	20

L958132-05 Original Sample (OS) • Matrix Spike (MS)

(OS) L958132-05 12/19/17 00:34 • (MS) R3274103-2 12/19/17 00:22

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
	mg/l	mg/l	mg/l	%		%	
Ethylene Dibromide	0.000100	U	0.000124	124	1	72.0-146	
1,2-Dibromo-3-Chloropropane	0.000100	U	0.000136	136	1	63.0-149	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina [1]	DW21704
Florida	E87487	North Carolina [2]	41
Georgia	NELAP	North Dakota	R-140
Georgia [1]	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky [1]	90010	South Dakota	n/a
Kentucky [2]	16	Tennessee [1 4]	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

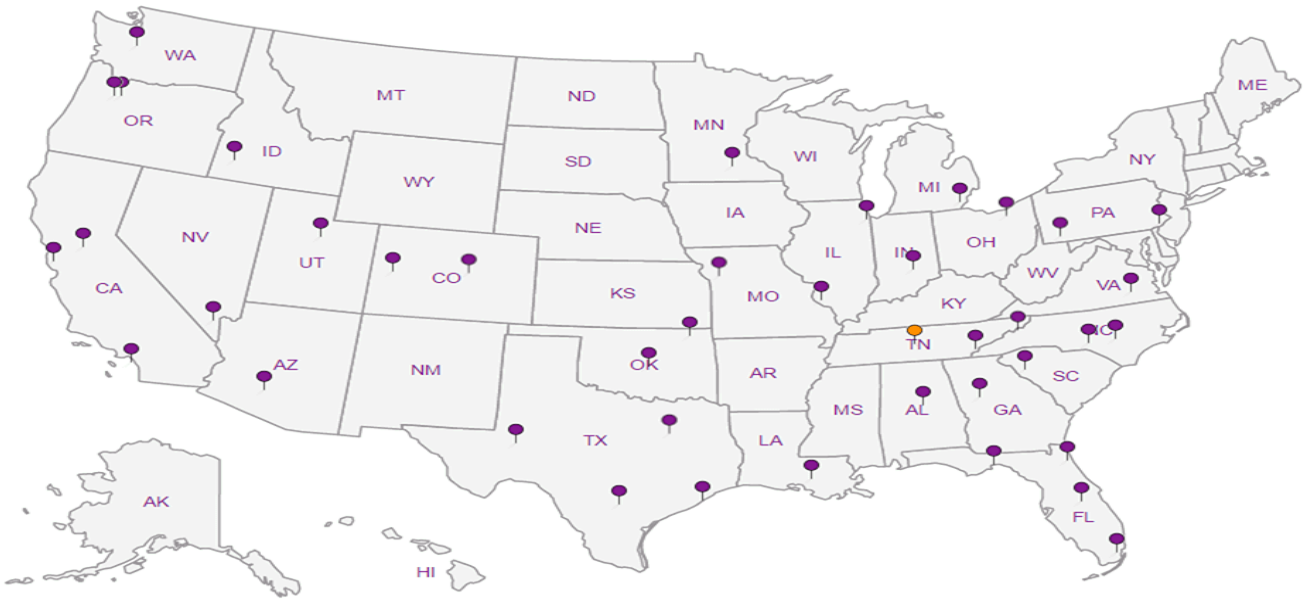
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold n/a Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Report to: Philip Campbell

Email To: pcampbell@cecinc.com

Project Description: EWS Camden Class 2 Landfill

City/State Collected:

Phone: 615-333-7797
Fax: 615-333-7751

Client Project # 171-873

Lab Project # CEC-EWS CAMDEN LF

Collected by (print): Ph. i P Campbell

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (signature): Phil P. Campbell

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALK,BR,CL,FL,NO2,NO3 125mlHDPE-NoPres (2 Containers - unpreserved)	COD 250mlHDPE-H2SO4	Metals AP1 250mlHDPE-HNO3 *	Metals AP1 Dissolved 250mlHDPE-HNO3 * Field Filtered	NH3 125mlHDPE-H2SO4	SV8011 40mlClr-NaThio	V8260AP1 40mlAmb-HCl	Remarks	Sample # (lab only)
~~APWC LEACHATE~~		GW				11	X	X	X	X	X	X	X		
~~IWC LEACHATE~~		GW				11	X	X	X	X	X	X	X		
MW-3	Grab	GW	-	12-14-17	16:00	12	X	X	X	X	X	X	X		-01

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Metals = Appl. I + Al, Boron, Ca, Fe, Mg, Mn, K, Na
Dissolved metals are Field Filtered & preserved

pH ____ Temp ____
Flow ____ Other ____

Samples returned via: ___ UPS ___ FedEx ___ Courier ___ _____

Tracking #

Relinquished by : (Signature) Phil P. Campbell — Date: 12-15-17 — Time: 9:00 — Received by: (Signature)

Relinquished by : (Signature) — Date: — Time: — Received by: (Signature)

Relinquished by : (Signature) — Date: 12/15/17 — Time: 1508 — Received for lab by: (Signature)

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp: 0.1 °C Bottles Received: 12

Date: 12-15-17 Time: 1508

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Chain of Custody Page 1 of 1

ESC LABORATORIES
a subsidiary of Pace Analytical
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L957954

B097

Acctnum: CEC
Template: T130822
Prelogin: P631277
TSR: 341 - John Hawkins
PB: 12-11-17

Shipped Via: Courier

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-3 (Re-Sample)
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC
DATE & TIME	12-13-17 / 16:00 / 12-14-17 16:00	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	~~Peristaltic Pump~~ Bailer	**FIELD REPRESENTATIVE**	~~Philip Campbell~~ Cooper Dunn - Philip Campbell
TOTAL WELL DEPTH (feet)	27.00	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	19.98	**IS SAMPLE EQUIPMENT DEDICATED?**	~~No~~ Yes, not used for re-sample
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	~~No~~ No
WATER COLUMN (feet)	7.02	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	3.5	**EQUIPMENT BLANK COLLECTED?**	No

PURGE INFORMATION - Cooper Dunn

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
1.25 ~~0~~	16:00	0	15.03	6.24	429	6.55	84	>1000
2.5 ~~+1.25~~	16:03	3	17.79	5.03	406	4.85	193	>1000
3.75 ~~2.5~~	16:06	6	18.37	5.88	399	4.72	206	371
~~3.75~~								

SAMPLE DATA - Next Day - 12-14-17

12-14-17

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
3.75	1600	-	14.2	5.42	529	3.25	93.4	23.0

Sample Charateristics (Odor, Color)	Clear, No odor	**Preservatives Used**	HCl, HNO_3, Na Thio, H_2SO_4
Number of Containers	12	**Sampler Signature**	Philip A. Campbell

NTU = 8.37 after filtering in field

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	yes
Well Clear of Weeds/Accessible?	yes/yes	**Fittings/Well Head Condition**	good/good
Pad/Casing Quality	good/ good	**Lock Condition**	good

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Pres Chk

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

ESC L·A·B S·C·I·E·N·C·E·S a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Report to: **Philip Campbell**

Email To: **pcampbell@cecinc.com**

Project Description: **EWS Camden Class 2 Landfill**

City/State Collected:

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **171-873**

Lab Project # **CEC-EWS CAMDEN LF**

Collected by (print): Philip Campbell

Site/Facility ID # **CAMDEN, TN**

P.O. #

Collected by (signature): Phil J. Campbell

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

L #

Table #

Acctnum: **CEC**
Template: **T130822**
Prelogin: **P631277**
TSR: **341 - John Hawkins**
PB: 12/11/17
Shipped Via: **Courier**

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALK,BR,CL,FL,NO2,NO3 125mlHDPE-NoPres	COD 250mlHDPE-H2SO4	Metals AP1 250mlHDPE-HNO3 *	Metals AP1 Dissolved 250mlHDPE-~~NoPres~~ HNO3 * Field Filtered	NH3 125mlHDPE-H2SO4	SV8011 40mlClr-NaThio	V8260AP1 40mlAmb-HCl			Remarks	Sample # (lab only)
~~APWC LEACHATE~~		~~GW~~				~~11~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~				
~~IWC LEACHATE~~		~~GW~~				~~11~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~				
MW-3	Grab	GW	–	12-14-17	16:00	12	X	X	X	X	X	X	X				

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other ________

Remarks: Metals = App. I + Al, Boron, Ca, Fe, Mg, Mn, K, Na
Dissolved metals are Field Filtered + Preserved

pH ______ Temp ______
Flow ______ Other ______

Samples returned via:
__ UPS __ FedEx __ Courier __ ______

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	
Phil J. Campbell	12-15-17	9:00	[signature]		
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:	If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:	Hold: Condition: NCF / OK

ANALYTICAL REPORT

January 31, 2018

Civil & Environmental Consultants - TN

Sample Delivery Group:	L957153
Samples Received:	12/13/2017
Project Number:	142-059
Description:	EWS Landfill GW Assessment

Report To: Philip Campbell
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Entire Report Reviewed By:

John Hawkins
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

TABLE OF CONTENTS

Cp: Cover Page 1

Tc: Table of Contents 2

Ss: Sample Summary 3

Cn: Case Narrative 4

Sr: Sample Results 5

IWC-L L957153-01 5

APWC-L L957153-02 8

Qc: Quality Control Summary 11

Wet Chemistry by Method 130.1 11

Wet Chemistry by Method 2320 B-2011 12

Wet Chemistry by Method 350.1 14

Wet Chemistry by Method 410.4 15

Wet Chemistry by Method 9056A 16

Mercury by Method 7470A 19

Metals (ICP) by Method 6010B 22

Metals (ICPMS) by Method 6020 24

Volatile Organic Compounds (GC/MS) by Method 8260B 30

EDB / DBCP by Method 8011 33

Gl: Glossary of Terms 34

Al: Accreditations & Locations 35

Sc: Sample Chain of Custody 36

IWC-L L957153-01 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	12/12/17 10:15	12/13/17 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	500	12/19/17 09:54	12/19/17 09:54	KK
Wet Chemistry by Method 2320 B-2011	WG1053330	1	12/15/17 14:19	12/15/17 14:19	MCG
Wet Chemistry by Method 350.1	WG1053808	200	12/19/17 15:04	12/19/17 15:04	JER
Wet Chemistry by Method 410.4	WG1053197	10	12/13/17 21:31	12/14/17 00:16	MZ
Wet Chemistry by Method 9056A	WG1053102	1	12/13/17 21:12	12/13/17 21:12	DR
Mercury by Method 7470A	WG1053452	10	12/14/17 20:21	12/15/17 09:33	ABL
Mercury by Method 7470A	WG1053454	10	12/14/17 11:03	12/14/17 21:16	ABL
Metals (ICP) by Method 6010B	WG1055151	5	12/19/17 11:09	12/19/17 19:30	ST
Metals (ICP) by Method 6010B	WG1055156	5	12/19/17 12:27	12/19/17 18:46	ST
Metals (ICPMS) by Method 6020	WG1053312	100	12/16/17 07:02	12/20/17 14:59	JDG
Metals (ICPMS) by Method 6020	WG1053312	1000	12/16/17 07:02	12/20/17 15:03	JPD
Metals (ICPMS) by Method 6020	WG1053414	100	12/15/17 09:46	12/19/17 13:57	JDG
Metals (ICPMS) by Method 6020	WG1053414	5000	12/15/17 09:46	12/20/17 15:29	JDG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1053252	1	12/14/17 00:32	12/14/17 00:32	JHH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1053252	10	12/14/17 14:53	12/14/17 14:53	BMB
EDB / DBCP by Method 8011	WG1053903	1	12/15/17 09:09	12/16/17 01:34	KLM

APWC-L L957153-02 GW

Collected by	Collected date/time	Received date/time
Philip Campbell	12/12/17 10:45	12/13/17 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	5	12/19/17 09:47	12/19/17 09:47	KK
Wet Chemistry by Method 2320 B-2011	WG1053578	100	12/19/17 10:50	12/19/17 10:50	MCG
Wet Chemistry by Method 350.1	WG1053808	2000	12/19/17 15:25	12/19/17 15:25	JER
Wet Chemistry by Method 410.4	WG1053197	40	12/13/17 21:31	12/14/17 00:17	MZ
Wet Chemistry by Method 9056A	WG1053102	1	12/13/17 21:25	12/13/17 21:25	DR
Wet Chemistry by Method 9056A	WG1053102	100	12/13/17 20:58	12/13/17 20:58	DR
Wet Chemistry by Method 9056A	WG1053384	10000	12/14/17 19:21	12/14/17 19:21	KCF
Mercury by Method 7470A	WG1053454	10	12/14/17 11:03	12/14/17 21:18	ABL
Mercury by Method 7470A	WG1054667	10	12/18/17 00:36	12/18/17 09:45	ABL
Metals (ICP) by Method 6010B	WG1055151	10	12/19/17 11:09	12/19/17 19:34	ST
Metals (ICP) by Method 6010B	WG1055156	9	12/19/17 12:27	12/19/17 17:12	ST
Metals (ICPMS) by Method 6020	WG1053312	20	12/16/17 07:02	12/20/17 14:30	JPD
Metals (ICPMS) by Method 6020	WG1053312	500	12/16/17 07:02	12/20/17 15:07	JPD
Metals (ICPMS) by Method 6020	WG1054206	9	12/18/17 13:21	12/18/17 20:17	LAT
Metals (ICPMS) by Method 6020	WG1054206	90	12/18/17 13:21	12/19/17 12:40	RDS
Metals (ICPMS) by Method 6020	WG1054206	90	12/18/17 13:21	12/19/17 15:23	LD
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1053252	1	12/14/17 00:52	12/14/17 00:52	JHH
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1053252	10	12/14/17 15:12	12/14/17 15:12	BMB
EDB / DBCP by Method 8011	WG1053903	1	12/15/17 09:09	12/16/17 01:46	KLM

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

John Hawkins
Technical Service Representative

Sample Handling and Receiving

The following analysis were performed from an unpreserved, insufficiently or inadequately preserved sample.

ESC Sample ID	Project Sample ID	Method
L957153-02	APWC-L	6010B, 6020, 7470A

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	27900		15000	500	12/19/2017 09:54	WG1054865

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	12/15/2017 14:19	WG1053330

Sample Narrative:
L957153-01 WG1053330: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	1030		20.0	200	12/19/2017 15:04	WG1053808

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	1350		100	10	12/14/2017 00:16	WG1053197

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/13/2017 21:12	WG1053102
Chloride	ND		1.00	1	12/13/2017 21:12	WG1053102
Fluoride	ND		0.100	1	12/13/2017 21:12	WG1053102
Nitrate	ND		0.100	1	12/13/2017 21:12	WG1053102
Sulfate	ND		5.00	1	12/13/2017 21:12	WG1053102

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.00200	10	12/15/2017 09:33	WG1053452
Mercury,Dissolved	0.00207	B	0.00200	10	12/14/2017 21:16	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		1.00	5	12/19/2017 18:46	WG1055156
Boron,Dissolved	ND		1.00	5	12/19/2017 19:30	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	279		10.0	100	12/19/2017 13:57	WG1053414
Aluminum,Dissolved	278		10.0	100	12/20/2017 14:59	WG1053312
Antimony	ND		0.200	100	12/19/2017 13:57	WG1053414
Antimony,Dissolved	ND		0.200	100	12/20/2017 14:59	WG1053312
Arsenic	0.247		0.200	100	12/19/2017 13:57	WG1053414
Arsenic,Dissolved	0.242		0.200	100	12/20/2017 14:59	WG1053312
Barium	0.950		0.500	100	12/19/2017 13:57	WG1053414
Barium,Dissolved	0.980		0.500	100	12/20/2017 14:59	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.200	100	12/19/2017 13:57	WG1053414
Beryllium,Dissolved	ND		0.200	100	12/20/2017 14:59	WG1053312
Cadmium	375		0.100	100	12/19/2017 13:57	WG1053414
Cadmium,Dissolved	363		0.100	100	12/20/2017 14:59	WG1053312
Calcium	3450		100	100	12/19/2017 13:57	WG1053414
Calcium,Dissolved	3340		100	100	12/20/2017 14:59	WG1053312
Chromium	ND		0.200	100	12/19/2017 13:57	WG1053414
Chromium,Dissolved	ND		0.200	100	12/20/2017 14:59	WG1053312
Cobalt	1.93		0.200	100	12/19/2017 13:57	WG1053414
Cobalt,Dissolved	1.94		0.200	100	12/20/2017 14:59	WG1053312
Copper	43.4		0.500	100	12/19/2017 13:57	WG1053414
Copper,Dissolved	41.6		0.500	100	12/20/2017 14:59	WG1053312
Iron	310		10.0	100	12/19/2017 13:57	WG1053414
Iron,Dissolved	293		10.0	100	12/20/2017 14:59	WG1053312
Lead	0.384		0.200	100	12/19/2017 13:57	WG1053414
Lead,Dissolved	0.380		0.200	100	12/20/2017 14:59	WG1053312
Magnesium	2300		100	100	12/19/2017 13:57	WG1053414
Magnesium,Dissolved	2360		100	100	12/20/2017 14:59	WG1053312
Manganese	609		0.500	100	12/19/2017 13:57	WG1053414
Manganese,Dissolved	617		0.500	100	12/20/2017 14:59	WG1053312
Nickel	1.67		0.200	100	12/19/2017 13:57	WG1053414
Nickel,Dissolved	1.70		0.200	100	12/20/2017 14:59	WG1053312
Potassium	5470		100	100	12/19/2017 13:57	WG1053414
Potassium,Dissolved	5700		100	100	12/20/2017 14:59	WG1053312
Selenium	0.496		0.200	100	12/19/2017 13:57	WG1053414
Selenium,Dissolved	0.885		0.200	100	12/20/2017 14:59	WG1053312
Silver	ND		0.200	100	12/19/2017 13:57	WG1053414
Silver,Dissolved	ND		0.200	100	12/20/2017 14:59	WG1053312
Sodium	10200		100	100	12/19/2017 13:57	WG1053414
Sodium,Dissolved	10500		100	100	12/20/2017 14:59	WG1053312
Thallium	ND		0.200	100	12/19/2017 13:57	WG1053414
Thallium,Dissolved	ND		0.200	100	12/20/2017 14:59	WG1053312
Vanadium	ND		0.500	100	12/19/2017 13:57	WG1053414
Vanadium,Dissolved	ND		0.500	100	12/20/2017 14:59	WG1053312
Zinc	4300		125	5000	12/20/2017 15:29	WG1053414
Zinc,Dissolved	3760		25.0	1000	12/20/2017 15:03	WG1053312

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	0.564	J4	0.500	10	12/14/2017 14:53	WG1053252
Acrylonitrile	ND		0.0100	1	12/14/2017 00:32	WG1053252
Benzene	ND		0.00100	1	12/14/2017 00:32	WG1053252
Bromochloromethane	ND		0.00100	1	12/14/2017 00:32	WG1053252
Bromodichloromethane	ND		0.00100	1	12/14/2017 00:32	WG1053252
Bromoform	ND		0.00100	1	12/14/2017 00:32	WG1053252
Bromomethane	ND		0.00500	1	12/14/2017 00:32	WG1053252
Carbon disulfide	ND		0.00100	1	12/14/2017 00:32	WG1053252
Carbon tetrachloride	ND		0.00100	1	12/14/2017 00:32	WG1053252
Chlorobenzene	ND		0.00100	1	12/14/2017 00:32	WG1053252
Chlorodibromomethane	ND		0.00100	1	12/14/2017 00:32	WG1053252
Chloroethane	ND		0.00500	1	12/14/2017 00:32	WG1053252
Chloroform	ND		0.00500	1	12/14/2017 00:32	WG1053252
Chloromethane	ND		0.00250	1	12/14/2017 00:32	WG1053252
Dibromomethane	ND		0.00100	1	12/14/2017 00:32	WG1053252
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	12/14/2017 00:32	WG1053252

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	12/14/2017 00:32	WG1053252
1,2-Dichlorobenzene	ND		0.00100	1	12/14/2017 00:32	WG1053252
1,4-Dichlorobenzene	ND		0.00100	1	12/14/2017 00:32	WG1053252
trans-1,4-Dichloro-2-butene	ND		0.00250	1	12/14/2017 00:32	WG1053252
1,1-Dichloroethane	ND		0.00100	1	12/14/2017 00:32	WG1053252
1,2-Dichloroethane	ND		0.00100	1	12/14/2017 00:32	WG1053252
1,1-Dichloroethene	ND		0.00100	1	12/14/2017 00:32	WG1053252
cis-1,2-Dichloroethene	ND		0.00100	1	12/14/2017 00:32	WG1053252
trans-1,2-Dichloroethene	ND		0.00100	1	12/14/2017 00:32	WG1053252
1,2-Dichloropropane	ND		0.00100	1	12/14/2017 00:32	WG1053252
cis-1,3-Dichloropropene	ND		0.00100	1	12/14/2017 00:32	WG1053252
trans-1,3-Dichloropropene	ND		0.00100	1	12/14/2017 00:32	WG1053252
Ethylbenzene	ND		0.00100	1	12/14/2017 00:32	WG1053252
2-Hexanone	ND		0.0100	1	12/14/2017 00:32	WG1053252
Iodomethane	ND		0.0100	1	12/14/2017 00:32	WG1053252
2-Butanone (MEK)	0.102		0.0100	1	12/14/2017 00:32	WG1053252
Methylene Chloride	ND		0.00500	1	12/14/2017 00:32	WG1053252
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	12/14/2017 00:32	WG1053252
Styrene	ND		0.00100	1	12/14/2017 00:32	WG1053252
1,1,1,2-Tetrachloroethane	ND		0.00100	1	12/14/2017 00:32	WG1053252
1,1,2,2-Tetrachloroethane	ND		0.00100	1	12/14/2017 00:32	WG1053252
Tetrachloroethene	ND		0.00100	1	12/14/2017 00:32	WG1053252
Toluene	0.00745		0.00100	1	12/14/2017 00:32	WG1053252
1,1,1-Trichloroethane	ND		0.00100	1	12/14/2017 00:32	WG1053252
1,1,2-Trichloroethane	ND		0.00100	1	12/14/2017 00:32	WG1053252
Trichloroethene	ND		0.00100	1	12/14/2017 00:32	WG1053252
Trichlorofluoromethane	ND		0.00500	1	12/14/2017 00:32	WG1053252
1,2,3-Trichloropropane	ND		0.00250	1	12/14/2017 00:32	WG1053252
Vinyl acetate	ND		0.0100	1	12/14/2017 00:32	WG1053252
Vinyl chloride	ND		0.00100	1	12/14/2017 00:32	WG1053252
Xylenes, Total	ND		0.00300	1	12/14/2017 00:32	WG1053252
(S) Toluene-d8	*101*		*80.0-120*		*12/14/2017 00:32*	WG1053252
(S) Toluene-d8	*116*		*80.0-120*		*12/14/2017 14:53*	WG1053252
(S) Dibromofluoromethane	*86.7*		*76.0-123*		*12/14/2017 14:53*	WG1053252
(S) Dibromofluoromethane	*102*		*76.0-123*		*12/14/2017 00:32*	WG1053252
(S) a,a,a-Trifluorotoluene	*94.3*		*80.0-120*		*12/14/2017 00:32*	WG1053252
(S) a,a,a-Trifluorotoluene	*99.4*		*80.0-120*		*12/14/2017 14:53*	WG1053252
(S) 4-Bromofluorobenzene	*95.4*		*80.0-120*		*12/14/2017 14:53*	WG1053252
(S) 4-Bromofluorobenzene	*117*		*80.0-120*		*12/14/2017 00:32*	WG1053252

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	12/16/2017 01:34	WG1053903
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	12/16/2017 01:34	WG1053903

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	955		150	5	12/19/2017 09:47	WG1054865

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	23500		2000	100	12/19/2017 10:50	WG1053578

Sample Narrative:
L957153-02 WG1053578: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	7750		200	2000	12/19/2017 15:25	WG1053808

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	25000		400	40	12/14/2017 00:17	WG1053197

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	179		100	100	12/13/2017 20:58	WG1053102
Chloride	146000		10000	10000	12/14/2017 19:21	WG1053384
Fluoride	ND		0.100	1	12/13/2017 21:25	WG1053102
Nitrate	4.37		0.100	1	12/13/2017 21:25	WG1053102
Sulfate	1240		500	100	12/13/2017 20:58	WG1053102

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.00200	10	12/18/2017 09:45	WG1054667
Mercury,Dissolved	ND		0.00200	10	12/14/2017 21:18	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	8.84		1.80	9	12/19/2017 17:12	WG1055156
Boron,Dissolved	9.67		2.00	10	12/19/2017 19:34	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.900	9	12/18/2017 20:17	WG1054206
Aluminum,Dissolved	ND		2.00	20	12/20/2017 14:30	WG1053312
Antimony	ND		0.180	90	12/19/2017 12:40	WG1054206
Antimony,Dissolved	0.0694		0.0400	20	12/20/2017 14:30	WG1053312
Arsenic	0.0210		0.0180	9	12/18/2017 20:17	WG1054206
Arsenic,Dissolved	ND		0.0400	20	12/20/2017 14:30	WG1053312
Barium	1.89	B	0.450	90	12/19/2017 15:23	WG1054206
Barium,Dissolved	2.10		0.100	20	12/20/2017 14:30	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Beryllium	ND		0.0180	9	12/18/2017 20:17	WG1054206
Beryllium,Dissolved	ND		0.0400	20	12/20/2017 14:30	WG1053312
Cadmium	0.219		0.0900	90	12/19/2017 12:40	WG1054206
Cadmium,Dissolved	0.354		0.0200	20	12/20/2017 14:30	WG1053312
Calcium	280		9.00	9	12/18/2017 20:17	WG1054206
Calcium,Dissolved	299		20.0	20	12/20/2017 14:30	WG1053312
Chromium	ND		0.0180	9	12/18/2017 20:17	WG1054206
Chromium,Dissolved	ND		0.0400	20	12/20/2017 14:30	WG1053312
Cobalt	0.0464		0.0180	9	12/18/2017 20:17	WG1054206
Cobalt,Dissolved	0.0515		0.0400	20	12/20/2017 14:30	WG1053312
Copper	11.6		0.450	90	12/19/2017 12:40	WG1054206
Copper,Dissolved	12.8		0.100	20	12/20/2017 14:30	WG1053312
Iron	ND		0.900	9	12/18/2017 20:17	WG1054206
Iron,Dissolved	ND		2.00	20	12/20/2017 14:30	WG1053312
Lead	ND		0.180	90	12/19/2017 12:40	WG1054206
Lead,Dissolved	ND		0.0400	20	12/20/2017 14:30	WG1053312
Magnesium	ND		9.00	9	12/18/2017 20:17	WG1054206
Magnesium,Dissolved	ND		20.0	20	12/20/2017 14:30	WG1053312
Manganese	0.303		0.0450	9	12/18/2017 20:17	WG1054206
Manganese,Dissolved	0.135	B	0.100	20	12/20/2017 14:30	WG1053312
Nickel	0.592		0.0180	9	12/18/2017 20:17	WG1054206
Nickel,Dissolved	0.680		0.0400	20	12/20/2017 14:30	WG1053312
Potassium	64100		90.0	90	12/19/2017 12:40	WG1054206
Potassium,Dissolved	54900		500	500	12/20/2017 15:07	WG1053312
Selenium	ND		0.180	90	12/19/2017 12:40	WG1054206
Selenium,Dissolved	ND		0.0400	20	12/20/2017 14:30	WG1053312
Silver	ND		0.180	90	12/19/2017 12:40	WG1054206
Silver,Dissolved	ND		0.0400	20	12/20/2017 14:30	WG1053312
Sodium	88600		90.0	90	12/19/2017 12:40	WG1054206
Sodium,Dissolved	92100		500	500	12/20/2017 15:07	WG1053312
Thallium	ND		0.180	90	12/19/2017 12:40	WG1054206
Thallium,Dissolved	ND		0.0400	20	12/20/2017 14:30	WG1053312
Vanadium	0.0725		0.0450	9	12/18/2017 20:17	WG1054206
Vanadium,Dissolved	ND		0.100	20	12/20/2017 14:30	WG1053312
Zinc	33.9		0.225	9	12/18/2017 20:17	WG1054206
Zinc,Dissolved	39.6		0.500	20	12/20/2017 14:30	WG1053312

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J4	0.500	10	12/14/2017 15:12	WG1053252
Acrylonitrile	ND		0.0100	1	12/14/2017 00:52	WG1053252
Benzene	ND		0.00100	1	12/14/2017 00:52	WG1053252
Bromochloromethane	ND		0.00100	1	12/14/2017 00:52	WG1053252
Bromodichloromethane	ND		0.00100	1	12/14/2017 00:52	WG1053252
Bromoform	ND		0.00100	1	12/14/2017 00:52	WG1053252
Bromomethane	ND		0.00500	1	12/14/2017 00:52	WG1053252
Carbon disulfide	ND		0.00100	1	12/14/2017 00:52	WG1053252
Carbon tetrachloride	ND		0.00100	1	12/14/2017 00:52	WG1053252
Chlorobenzene	ND		0.00100	1	12/14/2017 00:52	WG1053252
Chlorodibromomethane	ND		0.00100	1	12/14/2017 00:52	WG1053252
Chloroethane	ND		0.00500	1	12/14/2017 00:52	WG1053252
Chloroform	ND		0.00500	1	12/14/2017 00:52	WG1053252
Chloromethane	ND		0.00250	1	12/14/2017 00:52	WG1053252
Dibromomethane	ND		0.00100	1	12/14/2017 00:52	WG1053252
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	12/14/2017 00:52	WG1053252

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,2-Dibromoethane	ND		0.00100	1	12/14/2017 00:52	WG1053252
1,2-Dichlorobenzene	ND		0.00100	1	12/14/2017 00:52	WG1053252
1,4-Dichlorobenzene	ND		0.00100	1	12/14/2017 00:52	WG1053252
trans-1,4-Dichloro-2-butene	ND		0.00250	1	12/14/2017 00:52	WG1053252
1,1-Dichloroethane	ND		0.00100	1	12/14/2017 00:52	WG1053252
1,2-Dichloroethane	ND		0.00100	1	12/14/2017 00:52	WG1053252
1,1-Dichloroethene	ND		0.00100	1	12/14/2017 00:52	WG1053252
cis-1,2-Dichloroethene	ND		0.00100	1	12/14/2017 00:52	WG1053252
trans-1,2-Dichloroethene	ND		0.00100	1	12/14/2017 00:52	WG1053252
1,2-Dichloropropane	ND		0.00100	1	12/14/2017 00:52	WG1053252
cis-1,3-Dichloropropene	ND		0.00100	1	12/14/2017 00:52	WG1053252
trans-1,3-Dichloropropene	ND		0.00100	1	12/14/2017 00:52	WG1053252
Ethylbenzene	ND		0.00100	1	12/14/2017 00:52	WG1053252
2-Hexanone	ND		0.0100	1	12/14/2017 00:52	WG1053252
Iodomethane	ND		0.0100	1	12/14/2017 00:52	WG1053252
2-Butanone (MEK)	0.0381	V3	0.0100	1	12/14/2017 00:52	WG1053252
Methylene Chloride	ND		0.00500	1	12/14/2017 00:52	WG1053252
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	12/14/2017 00:52	WG1053252
Styrene	ND		0.00100	1	12/14/2017 00:52	WG1053252
1,1,1,2-Tetrachloroethane	ND		0.00100	1	12/14/2017 00:52	WG1053252
1,1,2,2-Tetrachloroethane	ND		0.00100	1	12/14/2017 00:52	WG1053252
Tetrachloroethene	ND		0.00100	1	12/14/2017 00:52	WG1053252
Toluene	ND		0.00100	1	12/14/2017 00:52	WG1053252
1,1,1-Trichloroethane	ND		0.00100	1	12/14/2017 00:52	WG1053252
1,1,2-Trichloroethane	ND		0.00100	1	12/14/2017 00:52	WG1053252
Trichloroethene	ND		0.00100	1	12/14/2017 00:52	WG1053252
Trichlorofluoromethane	ND		0.00500	1	12/14/2017 00:52	WG1053252
1,2,3-Trichloropropane	ND		0.00250	1	12/14/2017 00:52	WG1053252
Vinyl acetate	ND		0.0100	1	12/14/2017 00:52	WG1053252
Vinyl chloride	ND		0.00100	1	12/14/2017 00:52	WG1053252
Xylenes, Total	ND		0.00300	1	12/14/2017 00:52	WG1053252
(S) Toluene-d8	*114*		*80.0-120*		*12/14/2017 15:12*	WG1053252
(S) Toluene-d8	*91.8*		*80.0-120*		*12/14/2017 00:52*	WG1053252
(S) Dibromofluoromethane	*88.3*		*76.0-123*		*12/14/2017 15:12*	WG1053252
(S) Dibromofluoromethane	*82.9*		*76.0-123*		*12/14/2017 00:52*	WG1053252
(S) a,a,a-Trifluorotoluene	*83.0*		*80.0-120*		*12/14/2017 00:52*	WG1053252
(S) a,a,a-Trifluorotoluene	*101*		*80.0-120*		*12/14/2017 15:12*	WG1053252
(S) 4-Bromofluorobenzene	*97.0*		*80.0-120*		*12/14/2017 00:52*	WG1053252
(S) 4-Bromofluorobenzene	*100*		*80.0-120*		*12/14/2017 15:12*	WG1053252

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	12/16/2017 01:46	WG1053903
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	12/16/2017 01:46	WG1053903

Method Blank (MB)

(MB) R3274059-1 12/19/17 09:11

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	3.84	J	1.43	30.0

L957175-05 Original Sample (OS) • Duplicate (DUP)

(OS) L957175-05 12/19/17 09:38 • (DUP) R3274059-5 12/19/17 09:38

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	80.5	78.8	1	2.13		20

L957143-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957143-01 12/19/17 09:17 • (DUP) R3274059-4 12/19/17 09:18

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	ND	24.9	1	3.16	J	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274059-2 12/19/17 09:12 • (LCSD) R3274059-3 12/19/17 09:13

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	159	158	106	105	85-115			0.631	20

L957143-02 Original Sample (OS) • Duplicate (DUP)

(OS) L957143-02 12/15/17 13:28 • (DUP) R3273863-7 12/15/17 13:35

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	ND	18.0	1	0.373	J	20

Sample Narrative:
OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

L957683-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957683-01 12/15/17 15:11 • (DUP) R3273863-10 12/15/17 15:25

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	33.3	64.3	1	63.7	P1	20

Sample Narrative:
OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273863-1 12/15/17 13:01 • (LCSD) R3273863-9 12/15/17 14:26

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Alkalinity	100	107	91.9	107	91.9	85.0-115			14.9	20

Sample Narrative:
LCS: Endpoint pH 4.5
LCSD: Endpoint pH 4.5

L957324-03 Original Sample (OS) • Duplicate (DUP)

(OS) L957324-03 12/18/17 18:36 • (DUP) R3274042-1 12/18/17 18:43

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	153	154	1	0.955		20

Sample Narrative:
OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

L957346-14 Original Sample (OS) • Duplicate (DUP)

(OS) L957346-14 12/18/17 20:41 • (DUP) R3274042-8 12/18/17 20:48

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	35.3	33.4	1	5.33		20

Sample Narrative:
OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274042-7 12/18/17 19:41 • (LCSD) R3274042-10 12/18/17 21:00

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Alkalinity	100	105	103	105	103	85.0-115			1.98	20

Sample Narrative:
LCS: Endpoint pH 4.5
LCSD: Endpoint pH 4.5

Method Blank (MB)

(MB) R3274211-1 12/19/17 13:39

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ammonia Nitrogen	U		0.0317	0.100

L957143-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957143-01 12/19/17 13:51 • (DUP) R3274211-4 12/19/17 13:53

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	0.103	0.212	1	69.2	P1	10

L957175-04 Original Sample (OS) • Duplicate (DUP)

(OS) L957175-04 12/19/17 16:03 • (DUP) R3274211-9 12/19/17 16:04

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.000	1	0		10

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274211-2 12/19/17 13:40 • (LCSD) R3274211-3 12/19/17 13:42

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	7.50	7.20	7.27	96	97	90-110			0.995	20

L957143-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L957143-02 12/19/17 14:52 • (MS) R3274211-5 12/19/17 14:53

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	5.00	ND	5.17	103	1	90-110	

L957175-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957175-05 12/19/17 15:20 • (MS) R3274211-6 12/19/17 15:22 • (MSD) R3274211-7 12/19/17 15:23

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	5.00	0.223	5.14	5.26	98.2	101	1	90-110			2.48	20

Method Blank (MB)

(MB) R3272836-1 12/14/17 00:12

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
COD	U		3	10.0

L955243-01 Original Sample (OS) • Duplicate (DUP)

(OS) L955243-01 12/14/17 00:13 • (DUP) R3272836-4 12/14/17 00:13

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	610	602	1	1.28		20

L957172-08 Original Sample (OS) • Duplicate (DUP)

(OS) L957172-08 12/14/17 00:20 • (DUP) R3272836-7 12/14/17 00:20

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	30.3	32.7	1	7.43		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3272836-2 12/14/17 00:13 • (LCSD) R3272836-3 12/14/17 00:13

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
COD	242	246	236	102	97.7	90-110			4	20

L957143-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957143-08 12/14/17 00:15 • (MS) R3272836-5 12/14/17 00:15 • (MSD) R3272836-6 12/14/17 00:16

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
COD	400	ND	443	452	111	113	1	80-120			1.96	20

Method Blank (MB)

(MB) R3272830-1 12/13/17 07:18

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.0099	0.100
Nitrate	U		0.0227	0.100
Sulfate	U		0.0774	5.00

L957143-03 Original Sample (OS) • Duplicate (DUP)

(OS) L957143-03 12/13/17 15:04 • (DUP) R3272830-4 12/13/17 15:58

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0		15
Chloride	52.5	52.6	1	0.29		15
Fluoride	ND	0.000	1	0		15
Nitrate	1.10	1.13	1	2.62		15
Sulfate	ND	5.00	1	9.8	J	15

L957203-03 Original Sample (OS) • Duplicate (DUP)

(OS) L957203-03 12/13/17 17:34 • (DUP) R3272830-6 12/13/17 17:47

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	3.91	0.000	1	200	P1	15
Chloride	16.0	16.0	1	0.372		15
Fluoride	0.199	0.169	1	16	P1	15
Nitrate	0.650	0.652	1	0.399		15
Sulfate	34.4	34.6	1	0.714		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3272830-2 12/13/17 07:32 • (LCSD) R3272830-3 12/13/17 07:45

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromide	40.0	39.7	39.6	99.4	99	80-120			0.371	15
Chloride	40.0	39.8	39.7	99.4	99.3	80-120			0.14	15
Fluoride	8.00	8.21	8.21	103	103	80-120			0.0779	15
Nitrate	8.00	8.32	8.30	104	104	80-120			0.174	15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3272830-2 12/13/17 07:32 • (LCSD) R3272830-3 12/13/17 07:45

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Sulfate	40.0	40.1	40.1	100	100	80-120			0.173	15

L957143-07 Original Sample (OS) • Matrix Spike (MS)

(OS) L957143-07 12/13/17 16:12 • (MS) R3272830-5 12/13/17 16:25

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	47.4	94.8	1	80-120	
Chloride	50.0	6.65	56.1	98.9	1	80-120	
Fluoride	5.00	ND	4.97	99.3	1	80-120	
Nitrate	5.00	0.441	5.32	97.7	1	80-120	
Sulfate	50.0	ND	50.1	99	1	80-120	

L957203-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957203-03 12/13/17 17:34 • (MS) R3272830-7 12/13/17 18:28 • (MSD) R3272830-8 12/13/17 18:42

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	3.91	49.6	50.1	91.3	92.4	1	80-120			1.05	15
Chloride	50.0	16.0	66.8	66.3	102	101	1	80-120			0.702	15
Fluoride	5.00	0.199	5.29	5.31	102	102	1	80-120			0.434	15
Nitrate	5.00	0.650	5.77	5.72	102	101	1	80-120			0.878	15
Sulfate	50.0	34.4	85.6	85.0	102	101	1	80-120			0.696	15

Method Blank (MB)

(MB) R3273209-1 12/14/17 10:28

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Chloride	U		0.0519	1.00

L957101-06 Original Sample (OS) • Duplicate (DUP)

(OS) L957101-06 12/14/17 18:10 • (DUP) R3273209-4 12/14/17 18:24

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	28.1	28.2	1	0		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273209-2 12/14/17 10:42 • (LCSD) R3273209-3 12/14/17 10:56

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Chloride	40.0	40.0	39.9	100	100	80-120			0	15

L957101-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957101-06 12/14/17 18:10 • (MS) R3273209-5 12/14/17 18:38 • (MSD) R3273209-6 12/14/17 18:52

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chloride	50.0	28.1	79.0	78.3	102	101	1	80-120			1	15

Method Blank (MB)

(MB) R3273350-1 12/15/17 08:48

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.000049	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273350-2 12/15/17 08:50 • (LCSD) R3273350-3 12/15/17 08:52

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	0.00288	0.00270	96	89.9	80-120			6.55	20

L957143-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957143-02 12/15/17 08:55 • (MS) R3273350-4 12/15/17 08:57 • (MSD) R3273350-5 12/15/17 08:59

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	ND	0.00289	0.00279	96.4	92.9	1	75-125			3.73	20

Method Blank (MB)

(MB) R3273188-1 12/14/17 20:37

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury,Dissolved	0.000103	J	0.000049	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273188-2 12/14/17 20:39 • (LCSD) R3273188-3 12/14/17 20:42

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	0.00303	0.00301	101	100	80-120			0.652	20

L957143-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957143-02 12/14/17 20:44 • (MS) R3273188-4 12/14/17 20:46 • (MSD) R3273188-5 12/14/17 20:48

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	ND	0.00294	0.00297	98.1	99.1	1	75-125			0.998	20

Method Blank (MB)

(MB) R3273766-1 12/18/17 09:31

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.000049	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273766-2 12/18/17 09:33 • (LCSD) R3273766-3 12/18/17 09:36

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	0.00297	0.00245	98.9	81.8	80-120			19	20

L957726-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957726-01 12/18/17 09:38 • (MS) R3273766-4 12/18/17 09:40 • (MSD) R3273766-5 12/18/17 09:43

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	ND	0.00295	0.00294	98.3	97.9	1	75-125			0.466	20

Method Blank (MB)

(MB) R3274308-1 12/19/17 16:43

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Boron,Dissolved	U		0.0126	0.200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274308-2 12/19/17 16:46 • (LCSD) R3274308-3 12/19/17 16:49

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Boron,Dissolved	1.00	0.975	0.994	97.5	99.4	80-120			1.91	20

L958177-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L958177-02 12/19/17 16:53 • (MS) R3274308-5 12/19/17 16:59 • (MSD) R3274308-6 12/19/17 17:02

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Boron,Dissolved	1.00	ND	1.00	1.01	100	101	1	75-125			0.965	20

Method Blank (MB)

(MB) R3274323-1 12/19/17 16:27

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	0.0194	J	0.0126	0.200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274323-2 12/19/17 16:29 • (LCSD) R3274323-3 12/19/17 16:32

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Boron	1.00	1.01	0.955	101	95.5	80-120			5.34	20

L957143-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957143-01 12/19/17 16:35 • (MS) R3274323-5 12/19/17 16:40 • (MSD) R3274323-6 12/19/17 16:42

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1.00	ND	0.995	1.01	97.2	98.2	1	75-125			0.973	20

Method Blank (MB)

(MB) R3274363-2 12/19/17 18:55

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum,Dissolved	0.00832	J	0.00515	0.100
Antimony,Dissolved	U		0.000754	0.00200
Arsenic,Dissolved	U		0.00025	0.00200
Barium,Dissolved	U		0.00036	0.00500
Beryllium,Dissolved	U		0.00012	0.00200
Cadmium,Dissolved	U		0.00016	0.00100
Calcium,Dissolved	U		0.046	1.00
Chromium,Dissolved	0.000668	J	0.00054	0.00200
Copper,Dissolved	0.000642	J	0.00052	0.00500
Cobalt,Dissolved	U		0.00026	0.00200
Iron,Dissolved	U		0.015	0.100
Lead,Dissolved	U		0.00024	0.00200
Magnesium,Dissolved	U		0.1	1.00
Manganese,Dissolved	0.000863	J	0.00025	0.00500
Nickel,Dissolved	0.000547	J	0.00035	0.00200
Potassium,Dissolved	U		0.037	1.00
Selenium,Dissolved	U		0.00038	0.00200
Silver,Dissolved	U		0.00031	0.00200
Sodium,Dissolved	U		0.11	1.00
Thallium,Dissolved	U		0.00019	0.00200
Vanadium,Dissolved	0.000544	J	0.00018	0.00500
Zinc,Dissolved	U		0.00256	0.0250

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274363-3 12/19/17 18:58 • (LCSD) R3274363-4 12/19/17 19:02

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	5.48	5.25	110	105	80-120			4.21	20
Antimony,Dissolved	0.0500	0.0552	0.0544	110	109	80-120			1.44	20
Arsenic,Dissolved	0.0500	0.0537	0.0528	107	106	80-120			1.75	20
Barium,Dissolved	0.0500	0.0498	0.0475	99.6	95	80-120			4.75	20
Beryllium,Dissolved	0.0500	0.0480	0.0467	96	93.4	80-120			2.8	20
Cadmium,Dissolved	0.0500	0.0494	0.0480	98.8	96.1	80-120			2.76	20
Calcium,Dissolved	5.00	5.18	4.99	104	99.8	80-120			3.67	20
Chromium,Dissolved	0.0500	0.0520	0.0509	104	102	80-120			2.17	20
Copper,Dissolved	0.0500	0.0553	0.0534	111	107	80-120			3.57	20
Cobalt,Dissolved	0.0500	0.0526	0.0516	105	103	80-120			1.9	20
Iron,Dissolved	5.00	5.46	5.31	109	106	80-120			2.82	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274363-3 12/19/17 18:58 • (LCSD) R3274363-4 12/19/17 19:02

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead,Dissolved	0.0500	0.0516	0.0500	103	100	80-120			3.07	20
Magnesium,Dissolved	5.00	5.34	5.15	107	103	80-120			3.65	20
Manganese,Dissolved	0.0500	0.0509	0.0497	102	99.4	80-120			2.48	20
Nickel,Dissolved	0.0500	0.0529	0.0522	106	104	80-120			1.35	20
Potassium,Dissolved	5.00	5.37	5.19	107	104	80-120			3.42	20
Selenium,Dissolved	0.0500	0.0505	0.0484	101	96.9	80-120			4.24	20
Silver,Dissolved	0.0500	0.0504	0.0495	101	99.1	80-120			1.8	20
Sodium,Dissolved	5.00	5.34	5.15	107	103	80-120			3.53	20
Thallium,Dissolved	0.0500	0.0526	0.0507	105	101	80-120			3.65	20
Vanadium,Dissolved	0.0500	0.0505	0.0496	101	99.3	80-120			1.78	20
Zinc,Dissolved	0.0500	0.0530	0.0520	106	104	80-120			1.83	20

L957195-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957195-01 12/19/17 19:06 • (MS) R3274363-6 12/19/17 19:13 • (MSD) R3274363-7 12/19/17 19:17

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	U	5.38	5.24	108	105	1	75-125			2.49	20
Antimony,Dissolved	0.0500	0.00112	0.0582	0.0558	114	109	1	75-125			4.16	20
Arsenic,Dissolved	0.0500	0.0142	0.0667	0.0645	105	101	1	75-125			3.29	20
Barium,Dissolved	0.0500	0.106	0.156	0.154	99.3	96.2	1	75-125			0.995	20
Beryllium,Dissolved	0.0500	U	0.0474	0.0452	94.8	90.5	1	75-125			4.64	20
Cadmium,Dissolved	0.0500	U	0.0509	0.0486	102	97.1	1	75-125			4.62	20
Calcium,Dissolved	5.00	95.7	102	101	121	114	1	75-125			0.351	20
Chromium,Dissolved	0.0500	U	0.0506	0.0483	101	96.7	1	75-125			4.46	20
Copper,Dissolved	0.0500	0.00176	0.0529	0.0503	102	97.1	1	75-125			5.04	20
Cobalt,Dissolved	0.0500	0.000367	0.0513	0.0484	102	96	1	75-125			5.93	20
Potassium,Dissolved	5.00	17.8	23.1	23.1	105	107	1	75-125			0.32	20
Iron,Dissolved	5.00	U	5.33	5.06	107	101	1	75-125			5.05	20
Lead,Dissolved	0.0500	0.000326	0.0519	0.0496	103	98.5	1	75-125			4.57	20
Magnesium,Dissolved	5.00	40.5	45.7	45.6	106	102	1	75-125			0.378	20
Manganese,Dissolved	0.0500	0.0884	0.137	0.134	98.1	91.4	1	75-125			2.44	20
Nickel,Dissolved	0.0500	0.00315	0.0532	0.0512	100	96.2	1	75-125			3.86	20
Silver,Dissolved	0.0500	U	0.0498	0.0474	99.7	94.9	1	75-125			4.95	20
Sodium,Dissolved	5.00	110	115	115	89.1	102	1	75-125			0.563	20
Thallium,Dissolved	0.0500	U	0.0530	0.0508	106	102	1	75-125			4.23	20
Vanadium,Dissolved	0.0500	0.00185	0.0520	0.0499	100	96	1	75-125			4.27	20
Zinc,Dissolved	0.0500	0.00332	0.0519	0.0491	97.2	91.7	1	75-125			5.47	20

Method Blank (MB)

(MB) R3274036-1 12/18/17 21:27

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	U		0.00515	0.100
Antimony	U		0.000754	0.00200
Arsenic	U		0.00025	0.00200
Barium	U		0.00036	0.00500
Beryllium	U		0.00012	0.00200
Cadmium	U		0.00016	0.00100
Calcium	U		0.046	1.00
Chromium	U		0.00054	0.00200
Copper	U		0.00052	0.00500
Cobalt	U		0.00026	0.00200
Iron	U		0.015	0.100
Lead	0.000302	J	0.00024	0.00200
Magnesium	U		0.1	1.00
Manganese	U		0.00025	0.00500
Nickel	U		0.00035	0.00200
Potassium	U		0.037	1.00
Selenium	U		0.00038	0.00200
Silver	U		0.00031	0.00200
Sodium	U		0.11	1.00
Thallium	U		0.00019	0.00200
Vanadium	0.000319	J	0.00018	0.00500
Zinc	U		0.00256	0.0250

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274036-2 12/18/17 21:31 • (LCSD) R3274036-3 12/18/17 21:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	4.85	4.85	97.1	97	80-120			0.0783	20
Antimony	0.0500	0.0542	0.0543	108	109	80-120			0.152	20
Arsenic	0.0500	0.0508	0.0510	102	102	80-120			0.457	20
Barium	0.0500	0.0476	0.0485	95.2	96.9	80-120			1.79	20
Beryllium	0.0500	0.0490	0.0489	97.9	97.8	80-120			0.0849	20
Cadmium	0.0500	0.0484	0.0483	96.9	96.6	80-120			0.239	20
Calcium	5.00	4.95	4.99	99.1	99.7	80-120			0.634	20
Chromium	0.0500	0.0507	0.0507	101	101	80-120			0.0485	20
Copper	0.0500	0.0525	0.0519	105	104	80-120			1.02	20
Cobalt	0.0500	0.0520	0.0520	104	104	80-120			0.123	20
Iron	5.00	5.11	5.12	102	102	80-120			0.172	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274036-2 12/18/17 21:31 • (LCSD) R3274036-3 12/18/17 21:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead	0.0500	0.0495	0.0495	98.9	99	80-120			0.0341	20
Magnesium	5.00	5.14	5.13	103	103	80-120			0.0639	20
Manganese	0.0500	0.0489	0.0493	97.7	98.7	80-120			0.988	20
Nickel	0.0500	0.0519	0.0518	104	104	80-120			0.304	20
Potassium	5.00	5.18	5.21	104	104	80-120			0.616	20
Selenium	0.0500	0.0494	0.0493	98.7	98.6	80-120			0.168	20
Silver	0.0500	0.0508	0.0509	102	102	80-120			0.185	20
Sodium	5.00	5.10	5.08	102	102	80-120			0.424	20
Thallium	0.0500	0.0494	0.0499	98.8	99.8	80-120			0.993	20
Vanadium	0.0500	0.0493	0.0496	98.7	99.2	80-120			0.51	20
Zinc	0.0500	0.0512	0.0522	102	104	80-120			1.89	20

L957205-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957205-02 12/18/17 21:39 • (MS) R3274036-5 12/18/17 21:46 • (MSD) R3274036-6 12/18/17 21:50

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	ND	5.06	4.96	99.7	97.9	1	75-125			1.88	20
Antimony	0.0500	ND	0.0571	0.0558	114	112	1	75-125			2.27	20
Arsenic	0.0500	0.00380	0.0543	0.0529	101	98.1	1	75-125			2.6	20
Barium	0.0500	0.0218	0.0723	0.0712	101	98.8	1	75-125			1.57	20
Beryllium	0.0500	ND	0.0496	0.0489	99.3	97.9	1	75-125			1.43	20
Cadmium	0.0500	ND	0.0531	0.0514	106	103	1	75-125			3.29	20
Calcium	5.00	88.7	95.5	93.4	135	93.9	1	75-125	V		2.19	20
Chromium	0.0500	ND	0.0523	0.0513	102	99.8	1	75-125			1.77	20
Copper	0.0500	0.00810	0.0585	0.0573	101	98.3	1	75-125			2.21	20
Cobalt	0.0500	ND	0.0517	0.0504	103	101	1	75-125			2.55	20
Potassium	5.00	8.33	13.6	13.5	105	103	1	75-125			0.792	20
Iron	5.00	0.193	5.30	5.20	102	100	1	75-125			1.89	20
Lead	0.0500	ND	0.0519	0.0509	103	101	1	75-125			1.83	20
Magnesium	5.00	21.9	27.1	26.9	104	100	1	75-125			0.763	20
Manganese	0.0500	0.0116	0.0612	0.0603	99.1	97.5	1	75-125			1.4	20
Nickel	0.0500	ND	0.0512	0.0496	101	97.6	1	75-125			3.03	20
Selenium	0.0500	0.0479	0.104	0.103	112	110	1	75-125			0.708	20
Silver	0.0500	ND	0.0510	0.0498	102	99.6	1	75-125			2.35	20
Sodium	5.00	503	512	508	166	96.1	1	75-125	V		0.684	20
Thallium	0.0500	ND	0.0522	0.0516	104	103	1	75-125			1.08	20
Vanadium	0.0500	0.00603	0.0582	0.0567	104	101	1	75-125			2.49	20
Zinc	0.0500	ND	0.0532	0.0481	106	96.1	1	75-125			10.2	20

Method Blank (MB)

(MB) R3274043-1 12/18/17 19:51

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	0.00758	J	0.00515	0.100
Antimony	U		0.000754	0.00200
Arsenic	U		0.00025	0.00200
Barium	0.00275	J	0.00036	0.00500
Beryllium	U		0.00012	0.00200
Cadmium	U		0.00016	0.00100
Calcium	U		0.046	1.00
Chromium	0.000691	J	0.00054	0.00200
Copper	U		0.00052	0.00500
Cobalt	U		0.00026	0.00200
Iron	U		0.015	0.100
Lead	0.000637	J	0.00024	0.00200
Magnesium	U		0.1	1.00
Manganese	0.000602	J	0.00025	0.00500
Nickel	U		0.00035	0.00200
Potassium	0.0374	J	0.037	1.00
Selenium	U		0.00038	0.00200
Silver	U		0.00031	0.00200
Sodium	U		0.11	1.00
Thallium	U		0.00019	0.00200
Vanadium	U		0.00018	0.00500
Zinc	U		0.00256	0.0250

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274043-2 12/18/17 19:54 • (LCSD) R3274043-3 12/18/17 19:58

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	4.71	4.71	94.3	94.1	80-120			0.169	20
Antimony	0.0500	0.0558	0.0555	112	111	80-120			0.644	20
Arsenic	0.0500	0.0486	0.0487	97.2	97.5	80-120			0.271	20
Barium	0.0500	0.0475	0.0464	94.9	92.8	80-120			2.27	20
Beryllium	0.0500	0.0463	0.0457	92.6	91.3	80-120			1.4	20
Cadmium	0.0500	0.0477	0.0468	95.4	93.6	80-120			2	20
Calcium	5.00	4.87	4.81	97.4	96.3	80-120			1.18	20
Chromium	0.0500	0.0479	0.0474	95.9	94.9	80-120			1.05	20
Copper	0.0500	0.0523	0.0485	105	96.9	80-120			7.64	20
Cobalt	0.0500	0.0493	0.0488	98.7	97.6	80-120			1.07	20
Iron	5.00	4.95	4.92	99	98.4	80-120			0.598	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274043-2 12/18/17 19:54 • (LCSD) R3274043-3 12/18/17 19:58

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead	0.0500	0.0490	0.0477	98	95.4	80-120			2.63	20
Magnesium	5.00	4.78	4.76	95.5	95.3	80-120			0.289	20
Manganese	0.0500	0.0485	0.0482	97.1	96.5	80-120			0.62	20
Nickel	0.0500	0.0500	0.0494	99.9	98.9	80-120			1.07	20
Potassium	5.00	4.69	4.65	93.8	93.1	80-120			0.706	20
Selenium	0.0500	0.0559	0.0585	112	117	80-120			4.5	20
Silver	0.0500	0.0519	0.0520	104	104	80-120			0.261	20
Sodium	5.00	4.97	4.98	99.5	99.7	80-120			0.201	20
Thallium	0.0500	0.0487	0.0472	97.4	94.3	80-120			3.22	20
Vanadium	0.0500	0.0467	0.0465	93.4	92.9	80-120			0.484	20
Zinc	0.0500	0.0509	0.0515	102	103	80-120			1.12	20

L957844-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957844-01 12/18/17 20:02 • (MS) R3274043-5 12/18/17 20:10 • (MSD) R3274043-6 12/18/17 20:13

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	ND	4.73	4.74	94.1	94.2	1	75-125			0.102	20
Antimony	0.0500	ND	0.0554	0.0556	111	111	1	75-125			0.396	20
Arsenic	0.0500	ND	0.0505	0.0505	99.8	99.6	1	75-125			0.186	20
Barium	0.0500	0.101	0.148	0.148	94.6	93.3	1	75-125			0.447	20
Beryllium	0.0500	ND	0.0457	0.0468	91.5	93.7	1	75-125			2.39	20
Cadmium	0.0500	ND	0.0471	0.0466	94.3	93.1	1	75-125			1.21	20
Calcium	5.00	6.99	11.8	11.7	95.6	94.4	1	75-125			0.475	20
Chromium	0.0500	ND	0.0482	0.0484	94	94.3	1	75-125			0.282	20
Copper	0.0500	ND	0.0491	0.0490	96	95.8	1	75-125			0.243	20
Cobalt	0.0500	0.00232	0.0515	0.0511	98.4	97.5	1	75-125			0.816	20
Potassium	5.00	3.62	8.18	8.19	91.2	91.4	1	75-125			0.13	20
Iron	5.00	12.4	17.2	17.2	95.2	95.4	1	75-125			0.0516	20
Lead	0.0500	ND	0.0487	0.0482	95.9	94.8	1	75-125			1.16	20
Magnesium	5.00	1.41	6.21	6.19	96	95.6	1	75-125			0.292	20
Manganese	0.0500	0.162	0.209	0.208	92.5	91.5	1	75-125			0.237	20
Nickel	0.0500	0.00674	0.0560	0.0559	98.5	98.3	1	75-125			0.212	20
Selenium	0.0500	ND	0.0581	0.0586	116	117	1	75-125			0.908	20
Silver	0.0500	ND	0.0522	0.0521	104	104	1	75-125			0.167	20
Sodium	5.00	24.9	29.3	29.5	88	91.3	1	75-125			0.552	20
Thallium	0.0500	ND	0.0477	0.0472	95.4	94.4	1	75-125			0.957	20
Vanadium	0.0500	ND	0.0463	0.0462	92	91.9	1	75-125			0.124	20
Zinc	0.0500	0.210	0.257	0.257	94.3	92.6	1	75-125			0.339	20

Method Blank (MB)

(MB) R3272956-2 12/13/17 20:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acetone	U		0.0100	0.0500
Acrylonitrile	U		0.00187	0.0100
Benzene	U		0.000331	0.00100
Bromodichloromethane	U		0.000380	0.00100
Bromochloromethane	U		0.000520	0.00100
Bromoform	U		0.000469	0.00100
Bromomethane	U		0.000866	0.00500
Carbon disulfide	U		0.000275	0.00100
Carbon tetrachloride	U		0.000379	0.00100
Chlorobenzene	U		0.000348	0.00100
Chlorodibromomethane	U		0.000327	0.00100
Chloroethane	U		0.000453	0.00500
Chloroform	U		0.000324	0.00500
Chloromethane	U		0.000276	0.00250
1,2-Dibromo-3-Chloropropane	U		0.00133	0.00500
1,2-Dibromoethane	U		0.000381	0.00100
Dibromomethane	U		0.000346	0.00100
1,2-Dichlorobenzene	U		0.000349	0.00100
1,4-Dichlorobenzene	U		0.000274	0.00100
trans-1,4-Dichloro-2-butene	U		0.000866	0.00250
1,1-Dichloroethane	U		0.000259	0.00100
1,2-Dichloroethane	U		0.000361	0.00100
1,1-Dichloroethene	U		0.000398	0.00100
cis-1,2-Dichloroethene	U		0.000260	0.00100
trans-1,2-Dichloroethene	U		0.000396	0.00100
1,2-Dichloropropane	U		0.000306	0.00100
cis-1,3-Dichloropropene	U		0.000418	0.00100
trans-1,3-Dichloropropene	U		0.000419	0.00100
Ethylbenzene	U		0.000384	0.00100
2-Hexanone	U		0.00382	0.0100
Iodomethane	U		0.00171	0.0100
2-Butanone (MEK)	U		0.00393	0.0100
Methylene Chloride	U		0.00100	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.00214	0.0100
Styrene	U		0.000307	0.00100
1,1,1,2-Tetrachloroethane	U		0.000385	0.00100
1,1,2,2-Tetrachloroethane	U		0.000130	0.00100
Tetrachloroethene	U		0.000372	0.00100
Toluene	U		0.000412	0.00100
1,1,1-Trichloroethane	U		0.000319	0.00100

Method Blank (MB)

(MB) R3272956-2 12/13/17 20:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
1,1,2-Trichloroethane	U		0.000383	0.00100
Trichloroethene	U		0.000398	0.00100
Trichlorofluoromethane	U		0.00120	0.00500
1,2,3-Trichloropropane	U		0.000807	0.00250
Vinyl acetate	U		0.00163	0.0100
Vinyl chloride	U		0.000259	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	*102*			*80.0-120*
(S) Dibromofluoromethane	*105*			*76.0-123*
(S) a,a,a-Trifluorotoluene	*93.5*			*80.0-120*
(S) 4-Bromofluorobenzene	*112*			*80.0-120*

Laboratory Control Sample (LCS)

(LCS) R3272956-1 12/13/17 19:40

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acetone	0.125	0.226	181	10.0-160	J4
Acrylonitrile	0.125	0.125	99.8	60.0-142	
Benzene	0.0250	0.0263	105	69.0-123	
Bromodichloromethane	0.0250	0.0236	94.5	76.0-120	
Bromochloromethane	0.0250	0.0248	99.0	76.0-122	
Bromoform	0.0250	0.0240	96.1	67.0-132	
Bromomethane	0.0250	0.0193	77.3	18.0-160	
Carbon disulfide	0.0250	0.0254	102	55.0-127	
Carbon tetrachloride	0.0250	0.0234	93.8	63.0-122	
Chlorobenzene	0.0250	0.0258	103	79.0-121	
Chlorodibromomethane	0.0250	0.0245	98.2	75.0-125	
Chloroethane	0.0250	0.0190	75.9	47.0-152	
Chloroform	0.0250	0.0241	96.3	72.0-121	
Chloromethane	0.0250	0.0198	79.1	48.0-139	
1,2-Dibromo-3-Chloropropane	0.0250	0.0168	67.0	64.0-127	
1,2-Dibromoethane	0.0250	0.0254	102	77.0-123	
Dibromomethane	0.0250	0.0248	99.3	78.0-120	
1,2-Dichlorobenzene	0.0250	0.0256	102	80.0-120	
1,4-Dichlorobenzene	0.0250	0.0248	99.2	77.0-120	
trans-1,4-Dichloro-2-butene	0.0250	0.0245	97.9	55.0-134	
1,1-Dichloroethane	0.0250	0.0246	98.5	70.0-126	
1,2-Dichloroethane	0.0250	0.0248	99.3	67.0-126	

Laboratory Control Sample (LCS)

(LCS) R3272956-1 12/13/17 19:40

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
1,1-Dichloroethene	0.0250	0.0262	105	64.0-129	
cis-1,2-Dichloroethene	0.0250	0.0247	98.8	73.0-120	
trans-1,2-Dichloroethene	0.0250	0.0246	98.5	71.0-121	
1,2-Dichloropropane	0.0250	0.0242	97.0	75.0-125	
cis-1,3-Dichloropropene	0.0250	0.0256	102	79.0-123	
trans-1,3-Dichloropropene	0.0250	0.0239	95.6	74.0-127	
Ethylbenzene	0.0250	0.0264	105	77.0-120	
2-Hexanone	0.125	0.138	111	58.0-147	
Iodomethane	0.125	0.124	98.9	57.0-140	
2-Butanone (MEK)	0.125	0.155	124	37.0-158	
Methylene Chloride	0.0250	0.0240	95.9	66.0-121	
4-Methyl-2-pentanone (MIBK)	0.125	0.120	95.9	59.0-143	
Styrene	0.0250	0.0278	111	78.0-124	
1,1,1,2-Tetrachloroethane	0.0250	0.0238	95.1	75.0-122	
1,1,2,2-Tetrachloroethane	0.0250	0.0260	104	71.0-122	
Tetrachloroethene	0.0250	0.0235	93.9	70.0-127	
Toluene	0.0250	0.0253	101	77.0-120	
1,1,1-Trichloroethane	0.0250	0.0240	95.8	68.0-122	
1,1,2-Trichloroethane	0.0250	0.0252	101	78.0-120	
Trichloroethene	0.0250	0.0233	93.0	78.0-120	
Trichlorofluoromethane	0.0250	0.0233	93.2	56.0-137	
1,2,3-Trichloropropane	0.0250	0.0262	105	72.0-124	
Vinyl acetate	0.125	0.109	86.8	46.0-160	
Vinyl chloride	0.0250	0.0228	91.1	64.0-133	
Xylenes, Total	0.0750	0.0781	104	77.0-120	
(S) Toluene-d8			*103*	*80.0-120*	
(S) Dibromofluoromethane			*102*	*76.0-123*	
(S) a,a,a-Trifluorotoluene			*95.9*	*80.0-120*	
(S) 4-Bromofluorobenzene			*114*	*80.0-120*	

Method Blank (MB)

(MB) R3273577-1 12/16/17 00:38

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ethylene Dibromide	U		0.00000240	0.0000100
1,2-Dibromo-3-Chloropropane	U		0.00000430	0.0000200

L957225-17 Original Sample (OS) • Duplicate (DUP)

(OS) L957225-17 12/16/17 01:23 • (DUP) R3273577-3 12/16/17 01:12

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ethylene Dibromide	U	0.000	1.01	0.000		20
1,2-Dibromo-3-Chloropropane	U	0.000	1.01	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273577-4 12/16/17 03:05 • (LCSD) R3273577-5 12/16/17 05:11

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ethylene Dibromide	0.000250	0.000196	0.000205	78.4	82.1	60.0-140			4.63	20
1,2-Dibromo-3-Chloropropane	0.000250	0.000210	0.000226	83.9	90.3	60.0-140			7.37	20

L957225-18 Original Sample (OS) • Matrix Spike (MS)

(OS) L957225-18 12/16/17 01:00 • (MS) R3273577-2 12/16/17 00:49

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ethylene Dibromide	0.000100	U	0.000105	105	1	72.0-146	
1,2-Dibromo-3-Chloropropane	0.000100	U	0.000113	113	1	63.0-149	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J4	The associated batch QC was outside the established quality control range for accuracy.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
V	The sample concentration is too high to evaluate accurate spike recoveries.
V3	The internal standard exhibited poor recovery due to sample matrix interference. The analytical results will be biased high. BDL results will be unaffected.

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina [1]	DW21704
Florida	E87487	North Carolina [2]	41
Georgia	NELAP	North Dakota	R-140
Georgia [1]	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky [1]	90010	South Dakota	n/a
Kentucky [2]	16	Tennessee [1 4]	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

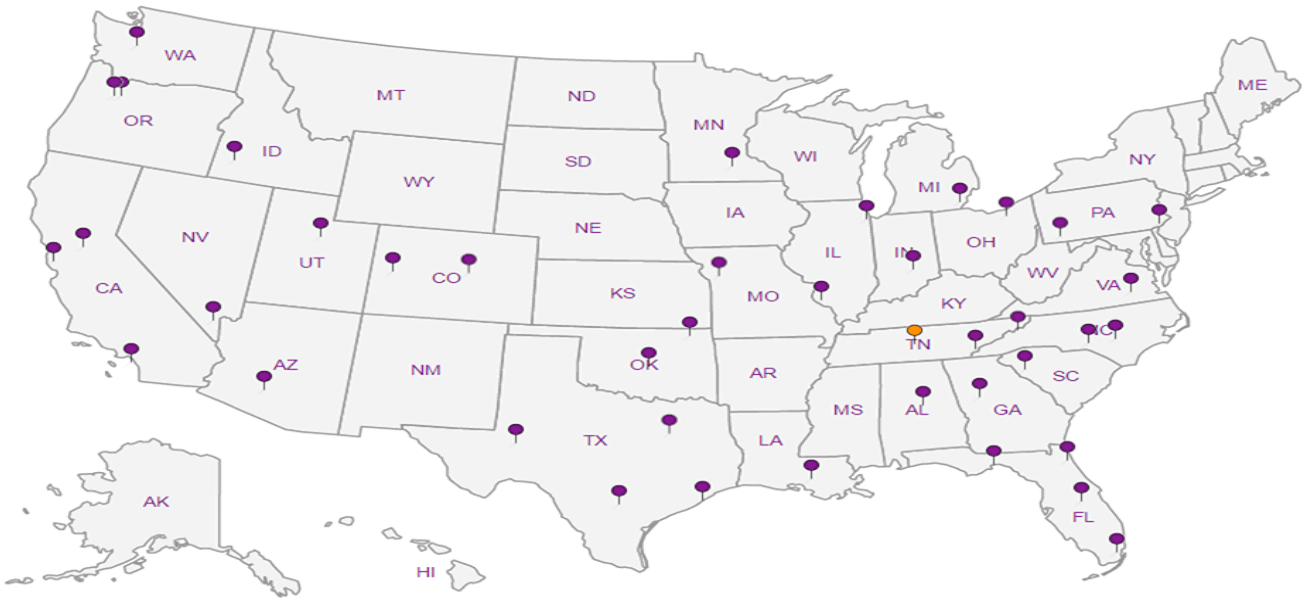
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold n/a Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Report to: Philip Campbell

Email To: mjohnson@cecinc.com,pcampbell@cecinc.com,kcl

Project Description: EWS Landfill

City/State Collected:

Phone: 615-333-7797
Fax: 615-333-7751

Client Project # 142-059

Lab Project # CEC-142-059

Collected by (print): Philip Campbell

Site/Facility ID #

P.O. #

Collected by (signature): Philip Campbell

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALK 125mlHDPE-NoPres	Bromide,Cl,F,NO3,SO4 125mlHDPE-NoPres	COD 250mlHDPE-H2SO4	COLILERT Microbiological	Diss. Metals 250mlHDPE-HNO3	Diss. Metals 250mlHDPE-NoPres	NH3 125mlHDPE-H2SO4	SV8011 40mlClr-NaThio	Total Metals + Hard 250mlHDPE-HNO3	Total Metals +Hard 250mlHDPE-HNO3	Remarks	Sample # (lab only)
~~EQUIPMENT BLANK~~		GW				12	X	X	X		X		X	X	X			
~~Grab~~																		
IWC-L	Grab	W	—	12-12-17	10:15	12	X	X	X			X	X	X	X			-01
AWC-L	Grab	W	—	12-12-17	10:45	12	X	X	X			X	X	X	X			-02

Chain of Custody Page 1 of 1

ESC LABORATORY SCIENCES
a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 957153

B046

Acctnum: CEC
Template: T128177
Prelogin: P628684
TSR: 341 - John Hawkins
PB: 11-29-17 CM
Shipped Via: Courier

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other

Remarks: Dissolved metals are ~~field filtered and preserved~~ Unpreserved. *Leachate samples high conductivity use caution
Total + Dissolved Metals = Appl + Ca, Mg, Mn, K, Fe, Na
pH ____ Temp ____
Flow ____ Other ____

Samples returned via: __ UPS __ FedEx __ Courier X CLT

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCl / MeoH TBR	If preservation required by Login: Date/Time
Philip Campbell	12-12-17	18:00			
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 4.5 °C Bottles Received: 24	
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature) 803	Date: 12/13/17 Time: 0800	Hold: Condition: NCF / OK

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Pres Chk

Report to: **Philip Campbell**

Email To: **mjohnson@cecinc.com,pcampbell@cecinc.com,kcl**

Project Description: **EWS Landfill**

City/State Collected:

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **142-059**

Lab Project # **CEC-142-059**

Collected by (print): Philip Campbell

Site/Facility ID #

P.O. #

Collected by (signature): Philip Campbell

Immediately Packed on Ice N ___ Y V

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

No. of Cntrs

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Total Metals+ Hard 250mlHDPE-HNO3	V8260AP1 40mlAmb-HCl	V8260AP1 40mlAmb-HCl-Blk	Remarks	Sample # (lab only)
~~EQUIPMENT BLANK~~		GW				2		X			
IWC-L	Grab	W	—	12-12-17	10:15			X			-01
AWC-L	Grab	W	—	12-12-17	10:45			X			-02

Chain of Custody Page 2 of 2

ESC LAB SCIENCES
a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L #

Table #

Acctnum: **CEC**
Template: **T128177**
Prelogin: **P628684**
TSR: **341 - John Hawkins**
PB: 11-29-17 CM

Shipped Via: **Courier**

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Dissolved metals are ~~field filtered and preserved~~ Unpreserved
Total Dissolved Metals = App. I + Ca, Mg, Mn, K, Boron, Na, Fe
(* use caution) samples highly conductive

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier X CLT

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Philip Campbell	12-12-17	1800	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)
			SCS

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp 2.8 °C Bottles Received: 24

Date: 12/13/17 Time: 0800

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	IWC-L
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	PC, low 40's, windy
DATE & TIME	12-D-17/ 10:15	**EVENT FREQUENCY**	~~Grab~~ Quarterly
PURGE METHOD	Grab	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	NA	**SAMPLING EQUIPMENT**	~~Bailer~~ Grab
DEPTH TO WATER (feet)	NA	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	NA	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	NA	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	NA	**EQUIPMENT BLANK COLLECTED?**	No

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
—	10:15	—	9.0	3.60	69,267	3.20	271.1	50.4

Sample Charateristics (Odor, Color)	Clear, No odor	**Preservatives Used**	HCl, HNO_3, H_2SO_4, NaOH
Number of Containers	12	**Sampler Signature**	Philip J. Campbell

* Dissolved metals - Lab filtered sample

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 329 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	APWC-L (AWC-L)
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	1C, 40's, windy
DATE & TIME	12-12-17/10:45	**EVENT FREQUENCY**	~~Grab~~ Quarterly
PURGE METHOD	Grab	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	NA	**SAMPLING EQUIPMENT**	~~Bailer~~ Grab
DEPTH TO WATER (feet)	NA	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	NA	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	NA	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	NA	**EQUIPMENT BLANK COLLECTED?**	No

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
—	10:45	—	50.4	9.03	498,184	0.13	-23.8	10.2

Sample Charaterlstics (Odor, Color)	Clear, No odor	**Preservatives Used**	HCl, HNO_3, H_2SO_4, NaOH, None
Number of Containers	12 12	**Sampler Signature**	Philip Campbell

*Dissolved Metals - Lab Filtered sample.

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Pres Chk

Report to: **Philip Campbell**

Email To: **mjohnson@cecinc.com,pcampbell@cecinc.com,kcl**

Project Description: **EWS Landfill**

City/State Collected:

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **142-059**

Lab Project # **CEC-142-059**

Collected by (print): Philip Campbell

Site/Facility ID #

P.O. #

Collected by (signature): Phil Campbell

Immediately Packed on Ice N___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day
Date Results Needed

Quote #

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALK 125mlHDPE-NoPres	Bromide,Cl,F,NO3,SO4 125mlHDPE-NoPres	COD 250mlHDPE-H2SO4	COLILERT Microbiological	~~Diss. Metals 250mlHDPE-HNO3~~	Diss. Metals 250mlHDPE-NoPres	NH3 125mlHDPE-H2SO4	SV8011 40mlClr-NaThio	Total Metals + Hard 250mlHDPE-HNO3	Total Metals +Hard 250mlHDPE-HNO3	Remarks	Sample # (lab only)
~~EQUIPMENT BLANK~~	~~Grab~~	GW				12	X	X	X		X		X	X	X			
IWC-L	Grab	W	—	12-12-17	10:15	12	X	X	X			X	X	X	X			
AWC-L	Grab	W	—	12-12-17	10:45	12	X	X	X			X	X	X	X			

Chain of Custody Page 1 of 1

ESC LABORATORIES
a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L #

Table #

Acctnum: **CEC**
Template: **T128177**
Prelogin: **P628684**
TSR: **341 - John Hawkins**
PB: 11-29-17 CM

Shipped Via: **Courier**

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Dissolved metals are ~~field filtered and preserved~~ Unpreserved. *Leachate samples high conductivity use caution
Total + Dissolved Metals = App I + Ca, Mg, Mn, K, Fe, Na
pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	If preservation required by Login: Date/Time
Phil Campbell	12-12-17	18:00			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:	Hold: / Condition: NCF / OK

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Pres Chk

Report to: **Philip Campbell**

Email To: **mjohnson@cecinc.com,pcampbell@cecinc.com,kcl**

Project Description: **EWS Landfill**

City/State Collected:

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **142-059**

Lab Project # **CEC-142-059**

Collected by (print): Philip Campbell

Site/Facility ID #

P.O. #

Collected by (signature): Philip Campbell

Immediately Packed on Ice N ___ Y V

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Total Metals+ Hard 250mlHDPE-HNO3	V8260AP1 40mlAmb-HCl	V8260AP1 40mlAmb-HCl-Blk								Remarks	Sample # (lab only)
~~EQUIPMENT BLANK~~		GW				12		X										
EWC-L	Grab	W	—	12-12-17	10:15			X										
AWC-L	Grab	W	—	12-12-17	10:45			X										

Analysis / Container / Preservative

Chain of Custody Page 2 of 2

ESC LABORATORY SCIENCES
a subsidiary of Accelerated

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L #

Table #

Acctnum: **CEC**
Template: **T128177**
Prelogin: **P628684**
TSR: **341 - John Hawkins**
PB: 11-29-17 CM

Shipped Via: **Courier**

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Dissolved metals are ~~field filtered and preserved~~ Unpreserved
Total + Dissolved Metals = App. I + Ca, Mg, Mn, K, Boron, Na, Fe
(* use caution) samples highly conductive!!

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Philip Campbell	12-12-17	1800		
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:
				If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:
				Hold: / Condition: NCF / OK

ANALYTICAL REPORT

December 20, 2017

Civil & Environmental Consultants - TN

Sample Delivery Group:	L957175
Samples Received:	12/13/2017
Project Number:	142-059
Description:	EWS Landfill Sediment & Stream Sampling

Report To: Philip Campbell
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Entire Report Reviewed By:

John Hawkins
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

Cp: Cover Page 1
Tc: Table of Contents 2
Ss: Sample Summary 3
Cn: Case Narrative 6
Sr: Sample Results 7
CHARLIE CREEK US L957175-01 7
CHARLIE CREEK MS L957175-02 9
CANE CREEK US L957175-03 11
CANE CREEK MS L957175-04 13
CANE CREEK DS-1 L957175-05 15
CHARLIE CREEK US L957175-06 17
CHARLIE CREEK MS L957175-07 18
CANE CREEK US L957175-08 19
CANE CREEK MS L957175-09 20
CANE CREEK DS-1 L957175-10 21
Qc: Quality Control Summary 22
Wet Chemistry by Method 130.1 22
Wet Chemistry by Method 350.1 23
Wet Chemistry by Method 9056A 26
Mercury by Method 7470A 30
Mercury by Method 7471A 32
Metals (ICP) by Method 6010B 33
Metals (ICPMS) by Method 6020 38
Gl: Glossary of Terms 42
Al: Accreditations & Locations 43
Sc: Sample Chain of Custody 44

CHARLIE CREEK US L957175-01 GW

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 14:00 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:34	12/19/17 09:34	KK
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 15:12	12/19/17 15:12	JER
Wet Chemistry by Method 9056A	WG1053253	1	12/14/17 06:57	12/14/17 06:57	KCF
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:36	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:20	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 17:48	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 17:15	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 21:39	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 14:44	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 22:48	LAT
Metals (ICPMS) by Method 6020	WG1053414	10	12/15/17 09:46	12/19/17 13:19	RDS

CHARLIE CREEK MS L957175-02 GW

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 12:50 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:35	12/19/17 09:35	KK
Wet Chemistry by Method 350.1	WG1053808	5	12/19/17 15:14	12/19/17 15:14	JER
Wet Chemistry by Method 9056A	WG1053253	1	12/14/17 07:41	12/14/17 07:41	MAJ
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:38	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:23	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 17:51	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 17:18	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 21:43	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 14:47	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 22:52	LAT
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/19/17 13:01	LAT

CANE CREEK US L957175-03 GW

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 13:30 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:36	12/19/17 09:36	KK
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 15:16	12/19/17 15:16	JER
Wet Chemistry by Method 9056A	WG1053253	1	12/14/17 07:55	12/14/17 07:55	MAJ
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:45	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:25	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 17:54	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 17:20	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 21:47	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 15:10	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 22:56	LAT
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/19/17 13:05	LAT

CANE CREEK MS L957175-04 GW

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 12:10 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:37	12/19/17 09:37	KK
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 16:03	12/19/17 16:03	JER
Wet Chemistry by Method 9056A	WG1053253	1	12/14/17 08:10	12/14/17 08:10	MAJ
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:47	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:34	ABL

CANE CREEK MS L957175-04 GW

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 12:10 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 18:04	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 17:23	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 21:50	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 15:14	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 23:45	LAT

CANE CREEK DS-1 L957175-05 GW

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 11:35 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:38	12/19/17 09:38	KK
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 15:20	12/19/17 15:20	JER
Wet Chemistry by Method 9056A	WG1053253	1	12/14/17 08:53	12/14/17 08:53	MAJ
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:49	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:37	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 18:08	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 17:31	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 21:54	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 15:18	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 23:49	LAT

CHARLIE CREEK US L957175-06 Solid

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 14:00 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG1053006	1	12/13/17 15:42	12/15/17 13:28	KK
Wet Chemistry by Method 9056A	WG1053001	1	12/13/17 16:30	12/15/17 16:00	KCF
Mercury by Method 7471A	WG1053105	1	12/14/17 12:30	12/14/17 19:28	EL
Metals (ICP) by Method 6010B	WG1053295	1	12/13/17 18:37	12/15/17 00:40	ST

CHARLIE CREEK MS L957175-07 Solid

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 12:50 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG1053006	1	12/13/17 15:42	12/15/17 13:30	KK
Wet Chemistry by Method 9056A	WG1053001	1	12/13/17 16:30	12/15/17 16:13	KCF
Mercury by Method 7471A	WG1053105	1	12/14/17 12:30	12/14/17 19:30	EL
Metals (ICP) by Method 6010B	WG1053295	1	12/13/17 18:37	12/15/17 00:43	ST

CANE CREEK US L957175-08 Solid

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 13:30 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG1053535	1	12/14/17 11:57	12/15/17 14:10	KK
Wet Chemistry by Method 9056A	WG1053001	1	12/13/17 16:30	12/15/17 16:27	KCF
Mercury by Method 7471A	WG1053105	1	12/14/17 12:30	12/14/17 19:33	EL
Metals (ICP) by Method 6010B	WG1053295	1	12/13/17 18:37	12/15/17 00:53	ST

CANE CREEK MS L957175-09 Solid

Collected by: C. L./ C. D.
Collected date/time: 12/11/17 12:10
Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG1053535	1	12/14/17 11:57	12/15/17 14:11	KK
Wet Chemistry by Method 9056A	WG1053001	1	12/13/17 16:30	12/15/17 16:40	KCF
Mercury by Method 7471A	WG1053105	1	12/14/17 12:30	12/14/17 19:35	EL
Metals (ICP) by Method 6010B	WG1053295	1	12/13/17 18:37	12/15/17 00:56	ST

CANE CREEK DS-1 L957175-10 Solid

Collected by: C. L./ C. D.
Collected date/time: 12/11/17 11:35
Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG1053535	1	12/14/17 11:57	12/15/17 14:13	KK
Wet Chemistry by Method 9056A	WG1053001	1	12/13/17 16:30	12/15/17 16:54	KCF
Mercury by Method 7471A	WG1053105	1	12/14/17 12:30	12/14/17 19:38	EL
Metals (ICP) by Method 6010B	WG1053295	1	12/13/17 18:37	12/15/17 01:00	ST

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

John Hawkins
Technical Service Representative

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	46.6		30.0	1	12/19/2017 09:34	WG1054865

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	2.06		0.100	1	12/19/2017 15:12	WG1053808

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND	P1	1.00	1	12/14/2017 06:57	WG1053253
Chloride	8.27		1.00	1	12/14/2017 06:57	WG1053253
Fluoride	ND		0.100	1	12/14/2017 06:57	WG1053253

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:36	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:20	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 17:15	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 17:48	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		1.00	10	12/19/2017 13:19	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 21:39	WG1053312
Antimony	ND		0.00200	1	12/18/2017 22:48	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Arsenic	ND		0.0200	10	12/19/2017 13:19	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Barium	0.0284		0.00500	1	12/18/2017 22:48	WG1053414
Barium,Dissolved	0.0297		0.00500	1	12/19/2017 21:39	WG1053312
Beryllium	ND		0.0200	10	12/19/2017 13:19	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 14:44	WG1053312
Cadmium	0.00375		0.00100	1	12/18/2017 22:48	WG1053414
Cadmium,Dissolved	0.00227		0.00100	1	12/20/2017 14:44	WG1053312
Calcium	10.9		10.0	10	12/19/2017 13:19	WG1053414
Calcium,Dissolved	12.2		1.00	1	12/19/2017 21:39	WG1053312
Chromium	ND		0.0200	10	12/19/2017 13:19	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Cobalt	ND		0.0200	10	12/19/2017 13:19	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Copper	ND		0.0500	10	12/19/2017 13:19	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 21:39	WG1053312
Iron	ND		1.00	10	12/19/2017 13:19	WG1053414
Iron,Dissolved	0.111		0.100	1	12/19/2017 21:39	WG1053312
Lead	ND		0.00200	1	12/18/2017 22:48	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	ND		10.0	10	12/19/2017 13:19	WG1053414
Magnesium,Dissolved	2.53		1.00	1	12/19/2017 21:39	WG1053312
Manganese	0.128		0.0500	10	12/19/2017 13:19	WG1053414
Manganese,Dissolved	0.130		0.00500	1	12/19/2017 21:39	WG1053312
Nickel	ND		0.0200	10	12/19/2017 13:19	WG1053414
Nickel,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Potassium	ND		10.0	10	12/19/2017 13:19	WG1053414
Potassium,Dissolved	1.56		1.00	1	12/20/2017 14:44	WG1053312
Selenium	ND		0.00200	1	12/18/2017 22:48	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Silver	ND		0.00200	1	12/18/2017 22:48	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Sodium	ND		10.0	10	12/19/2017 13:19	WG1053414
Sodium,Dissolved	6.92		1.00	1	12/19/2017 21:39	WG1053312
Thallium	ND		0.00200	1	12/18/2017 22:48	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Vanadium	ND		0.0500	10	12/19/2017 13:19	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 21:39	WG1053312
Zinc	ND		0.250	10	12/19/2017 13:19	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 21:39	WG1053312

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	54.9		30.0	1	12/19/2017 09:35	WG1054865

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	10.1		0.500	5	12/19/2017 15:14	WG1053808

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/14/2017 07:41	WG1053253
Chloride	10.9		1.00	1	12/14/2017 07:41	WG1053253
Fluoride	ND		0.100	1	12/14/2017 07:41	WG1053253

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:38	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:23	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 17:18	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 17:51	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	12/19/2017 13:01	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 21:43	WG1053312
Antimony	ND		0.00200	1	12/18/2017 22:52	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Arsenic	ND		0.00200	1	12/19/2017 13:01	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Barium	0.0312		0.00500	1	12/18/2017 22:52	WG1053414
Barium,Dissolved	0.0331		0.00500	1	12/19/2017 21:43	WG1053312
Beryllium	ND		0.00200	1	12/19/2017 13:01	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 14:47	WG1053312
Cadmium	0.00200		0.00100	1	12/18/2017 22:52	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/20/2017 14:47	WG1053312
Calcium	13.2		1.00	1	12/19/2017 13:01	WG1053414
Calcium,Dissolved	14.8		1.00	1	12/19/2017 21:43	WG1053312
Chromium	ND		0.00200	1	12/19/2017 13:01	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Cobalt	ND		0.00200	1	12/19/2017 13:01	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Copper	0.00516		0.00500	1	12/18/2017 22:52	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 21:43	WG1053312
Iron	0.417		0.100	1	12/19/2017 13:01	WG1053414
Iron,Dissolved	0.121		0.100	1	12/19/2017 21:43	WG1053312
Lead	ND		0.00200	1	12/18/2017 22:52	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	2.82		1.00	1	12/19/2017 13:01	WG1053414
Magnesium,Dissolved	3.08		1.00	1	12/19/2017 21:43	WG1053312
Manganese	0.317		0.00500	1	12/19/2017 13:01	WG1053414
Manganese,Dissolved	0.349		0.00500	1	12/19/2017 21:43	WG1053312
Nickel	ND		0.00200	1	12/19/2017 13:01	WG1053414
Nickel,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Potassium	1.57		1.00	1	12/19/2017 13:01	WG1053414
Potassium,Dissolved	1.72		1.00	1	12/20/2017 14:47	WG1053312
Selenium	ND		0.00200	1	12/18/2017 22:52	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Silver	ND		0.00200	1	12/18/2017 22:52	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Sodium	6.39		1.00	1	12/19/2017 13:01	WG1053414
Sodium,Dissolved	7.34		1.00	1	12/19/2017 21:43	WG1053312
Thallium	ND		0.00200	1	12/18/2017 22:52	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Vanadium	ND		0.00500	1	12/19/2017 13:01	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 21:43	WG1053312
Zinc	ND		0.0250	1	12/19/2017 13:01	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 21:43	WG1053312

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	89.5		30.0	1	12/19/2017 09:36	WG1054865

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	0.266		0.100	1	12/19/2017 15:16	WG1053808

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/14/2017 07:55	WG1053253
Chloride	11.4		1.00	1	12/14/2017 07:55	WG1053253
Fluoride	ND		0.100	1	12/14/2017 07:55	WG1053253

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:45	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:25	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 17:20	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 17:54	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	12/19/2017 13:05	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 21:47	WG1053312
Antimony	ND		0.00200	1	12/18/2017 22:56	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312
Arsenic	ND		0.00200	1	12/18/2017 22:56	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312
Barium	0.0340		0.00500	1	12/18/2017 22:56	WG1053414
Barium,Dissolved	0.0325		0.00500	1	12/19/2017 21:47	WG1053312
Beryllium	ND		0.00200	1	12/18/2017 22:56	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 15:10	WG1053312
Cadmium	ND		0.00100	1	12/18/2017 22:56	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/20/2017 15:10	WG1053312
Calcium	18.1		1.00	1	12/19/2017 13:05	WG1053414
Calcium,Dissolved	20.3		1.00	1	12/19/2017 21:47	WG1053312
Chromium	ND		0.00200	1	12/18/2017 22:56	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312
Cobalt	0.00226		0.00200	1	12/18/2017 22:56	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312
Copper	ND		0.00500	1	12/18/2017 22:56	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 21:47	WG1053312
Iron	0.920		0.100	1	12/18/2017 22:56	WG1053414
Iron,Dissolved	0.121		0.100	1	12/19/2017 21:47	WG1053312
Lead	ND		0.00200	1	12/18/2017 22:56	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	6.29		1.00	1	12/19/2017 13:05	WG1053414
Magnesium,Dissolved	6.82		1.00	1	12/19/2017 21:47	WG1053312
Manganese	0.735		0.00500	1	12/18/2017 22:56	WG1053414
Manganese,Dissolved	0.474		0.00500	1	12/19/2017 21:47	WG1053312
Nickel	0.00409		0.00200	1	12/18/2017 22:56	WG1053414
Nickel,Dissolved	0.00340	B	0.00200	1	12/19/2017 21:47	WG1053312
Potassium	2.33		1.00	1	12/19/2017 13:05	WG1053414
Potassium,Dissolved	2.46		1.00	1	12/20/2017 15:10	WG1053312
Selenium	ND		0.00200	1	12/18/2017 22:56	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312
Silver	ND		0.00200	1	12/18/2017 22:56	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312
Sodium	8.23		1.00	1	12/19/2017 13:05	WG1053414
Sodium,Dissolved	9.26		1.00	1	12/19/2017 21:47	WG1053312
Thallium	ND		0.00200	1	12/18/2017 22:56	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312
Vanadium	ND		0.00500	1	12/18/2017 22:56	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 21:47	WG1053312
Zinc	ND		0.0250	1	12/18/2017 22:56	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 21:47	WG1053312

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	80.1		30.0	1	12/19/2017 09:37	WG1054865

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	12/19/2017 16:03	WG1053808

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/14/2017 08:10	WG1053253
Chloride	11.6		1.00	1	12/14/2017 08:10	WG1053253
Fluoride	ND		0.100	1	12/14/2017 08:10	WG1053253

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:47	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:34	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 17:23	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 18:04	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	12/18/2017 23:45	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 21:50	WG1053312
Antimony	ND		0.00200	1	12/18/2017 23:45	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312
Arsenic	ND		0.00200	1	12/18/2017 23:45	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312
Barium	0.0331		0.00500	1	12/18/2017 23:45	WG1053414
Barium,Dissolved	0.0345		0.00500	1	12/19/2017 21:50	WG1053312
Beryllium	ND		0.00200	1	12/18/2017 23:45	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 15:14	WG1053312
Cadmium	ND		0.00100	1	12/18/2017 23:45	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/20/2017 15:14	WG1053312
Calcium	18.8		1.00	1	12/18/2017 23:45	WG1053414
Calcium,Dissolved	19.1		1.00	1	12/19/2017 21:50	WG1053312
Chromium	ND		0.00200	1	12/18/2017 23:45	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312
Cobalt	ND		0.00200	1	12/18/2017 23:45	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312
Copper	ND		0.00500	1	12/18/2017 23:45	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 21:50	WG1053312
Iron	0.709		0.100	1	12/18/2017 23:45	WG1053414
Iron,Dissolved	0.134		0.100	1	12/19/2017 21:50	WG1053312
Lead	ND		0.00200	1	12/18/2017 23:45	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	6.00		1.00	1	12/18/2017 23:45	WG1053414
Magnesium,Dissolved	5.74		1.00	1	12/19/2017 21:50	WG1053312
Manganese	0.515		0.00500	1	12/18/2017 23:45	WG1053414
Manganese,Dissolved	0.540		0.00500	1	12/19/2017 21:50	WG1053312
Nickel	0.00300		0.00200	1	12/18/2017 23:45	WG1053414
Nickel,Dissolved	0.00259	B	0.00200	1	12/19/2017 21:50	WG1053312
Potassium	2.17		1.00	1	12/18/2017 23:45	WG1053414
Potassium,Dissolved	2.16		1.00	1	12/20/2017 15:14	WG1053312
Selenium	ND		0.00200	1	12/18/2017 23:45	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312
Silver	ND		0.00200	1	12/18/2017 23:45	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312
Sodium	8.49		1.00	1	12/18/2017 23:45	WG1053414
Sodium,Dissolved	8.69		1.00	1	12/19/2017 21:50	WG1053312
Thallium	ND		0.00200	1	12/18/2017 23:45	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312
Vanadium	ND		0.00500	1	12/18/2017 23:45	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 21:50	WG1053312
Zinc	ND		0.0250	1	12/18/2017 23:45	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 21:50	WG1053312

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	80.5		30.0	1	12/19/2017 09:38	WG1054865

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	0.223		0.100	1	12/19/2017 15:20	WG1053808

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/14/2017 08:53	WG1053253
Chloride	12.7		1.00	1	12/14/2017 08:53	WG1053253
Fluoride	ND		0.100	1	12/14/2017 08:53	WG1053253

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:49	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:37	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 17:31	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 18:08	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	12/18/2017 23:49	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 21:54	WG1053312
Antimony	ND		0.00200	1	12/18/2017 23:49	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312
Arsenic	ND		0.00200	1	12/18/2017 23:49	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312
Barium	0.0346		0.00500	1	12/18/2017 23:49	WG1053414
Barium,Dissolved	0.0358		0.00500	1	12/19/2017 21:54	WG1053312
Beryllium	ND		0.00200	1	12/18/2017 23:49	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 15:18	WG1053312
Cadmium	ND		0.00100	1	12/18/2017 23:49	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/20/2017 15:18	WG1053312
Calcium	18.9		1.00	1	12/18/2017 23:49	WG1053414
Calcium,Dissolved	19.2		1.00	1	12/19/2017 21:54	WG1053312
Chromium	ND		0.00200	1	12/18/2017 23:49	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312
Cobalt	ND		0.00200	1	12/18/2017 23:49	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312
Copper	ND		0.00500	1	12/18/2017 23:49	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 21:54	WG1053312
Iron	0.736		0.100	1	12/18/2017 23:49	WG1053414
Iron,Dissolved	0.168		0.100	1	12/19/2017 21:54	WG1053312
Lead	ND		0.00200	1	12/18/2017 23:49	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	5.99		1.00	1	12/18/2017 23:49	WG1053414
Magnesium,Dissolved	5.80		1.00	1	12/19/2017 21:54	WG1053312
Manganese	0.525		0.00500	1	12/18/2017 23:49	WG1053414
Manganese,Dissolved	0.529		0.00500	1	12/19/2017 21:54	WG1053312
Nickel	0.00430		0.00200	1	12/18/2017 23:49	WG1053414
Nickel,Dissolved	0.00264	B	0.00200	1	12/19/2017 21:54	WG1053312
Potassium	2.26		1.00	1	12/18/2017 23:49	WG1053414
Potassium,Dissolved	2.28		1.00	1	12/20/2017 15:18	WG1053312
Selenium	ND		0.00200	1	12/18/2017 23:49	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312
Silver	ND		0.00200	1	12/18/2017 23:49	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312
Sodium	8.76		1.00	1	12/18/2017 23:49	WG1053414
Sodium,Dissolved	9.01		1.00	1	12/19/2017 21:54	WG1053312
Thallium	ND		0.00200	1	12/18/2017 23:49	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312
Vanadium	ND		0.00500	1	12/18/2017 23:49	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 21:54	WG1053312
Zinc	ND		0.0250	1	12/18/2017 23:49	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 21:54	WG1053312

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Ammonia Nitrogen	ND		5.00	1	12/15/2017 13:28	WG1053006

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Bromide	ND		10.0	1	12/15/2017 16:00	WG1053001
Chloride	44.6		10.0	1	12/15/2017 16:00	WG1053001
Fluoride	1.68		1.00	1	12/15/2017 16:00	WG1053001

Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Mercury	ND		0.0200	1	12/14/2017 19:28	WG1053105

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aluminum	727		10.0	1	12/15/2017 00:40	WG1053295
Antimony	ND		2.00	1	12/15/2017 00:40	WG1053295
Arsenic	ND		2.00	1	12/15/2017 00:40	WG1053295
Barium	7.83		0.500	1	12/15/2017 00:40	WG1053295
Beryllium	ND		0.200	1	12/15/2017 00:40	WG1053295
Boron	ND		10.0	1	12/15/2017 00:40	WG1053295
Cadmium	ND		0.500	1	12/15/2017 00:40	WG1053295
Calcium	ND		100	1	12/15/2017 00:40	WG1053295
Chromium	3.44		1.00	1	12/15/2017 00:40	WG1053295
Cobalt	ND		1.00	1	12/15/2017 00:40	WG1053295
Copper	ND		2.00	1	12/15/2017 00:40	WG1053295
Iron	2370		10.0	1	12/15/2017 00:40	WG1053295
Lead	1.60		0.500	1	12/15/2017 00:40	WG1053295
Magnesium	ND		100	1	12/15/2017 00:40	WG1053295
Manganese	64.7		1.00	1	12/15/2017 00:40	WG1053295
Nickel	ND		2.00	1	12/15/2017 00:40	WG1053295
Potassium	100		100	1	12/15/2017 00:40	WG1053295
Selenium	ND		2.00	1	12/15/2017 00:40	WG1053295
Silver	ND		1.00	1	12/15/2017 00:40	WG1053295
Sodium	ND		100	1	12/15/2017 00:40	WG1053295
Thallium	ND		2.00	1	12/15/2017 00:40	WG1053295
Vanadium	3.95		2.00	1	12/15/2017 00:40	WG1053295
Zinc	5.16		5.00	1	12/15/2017 00:40	WG1053295

Wet Chemistry by Method 350.1

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		5.00	1	12/15/2017 13:30	WG1053006

Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bromide	ND		10.0	1	12/15/2017 16:13	WG1053001
Chloride	53.8		10.0	1	12/15/2017 16:13	WG1053001
Fluoride	4.39		1.00	1	12/15/2017 16:13	WG1053001

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	12/14/2017 19:30	WG1053105

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Aluminum	1970		10.0	1	12/15/2017 00:43	WG1053295
Antimony	ND		2.00	1	12/15/2017 00:43	WG1053295
Arsenic	ND		2.00	1	12/15/2017 00:43	WG1053295
Barium	16.4		0.500	1	12/15/2017 00:43	WG1053295
Beryllium	ND		0.200	1	12/15/2017 00:43	WG1053295
Boron	ND		10.0	1	12/15/2017 00:43	WG1053295
Cadmium	ND		0.500	1	12/15/2017 00:43	WG1053295
Calcium	226		100	1	12/15/2017 00:43	WG1053295
Chromium	3.42		1.00	1	12/15/2017 00:43	WG1053295
Cobalt	1.36		1.00	1	12/15/2017 00:43	WG1053295
Copper	ND		2.00	1	12/15/2017 00:43	WG1053295
Iron	3300		10.0	1	12/15/2017 00:43	WG1053295
Lead	2.79		0.500	1	12/15/2017 00:43	WG1053295
Magnesium	172		100	1	12/15/2017 00:43	WG1053295
Manganese	122		1.00	1	12/15/2017 00:43	WG1053295
Nickel	ND		2.00	1	12/15/2017 00:43	WG1053295
Potassium	192		100	1	12/15/2017 00:43	WG1053295
Selenium	ND		2.00	1	12/15/2017 00:43	WG1053295
Silver	ND		1.00	1	12/15/2017 00:43	WG1053295
Sodium	ND		100	1	12/15/2017 00:43	WG1053295
Thallium	ND		2.00	1	12/15/2017 00:43	WG1053295
Vanadium	6.10		2.00	1	12/15/2017 00:43	WG1053295
Zinc	12.5		5.00	1	12/15/2017 00:43	WG1053295

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Ammonia Nitrogen	ND		5.00	1	12/15/2017 14:10	WG1053535

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Bromide	ND		10.0	1	12/15/2017 16:27	WG1053001
Chloride	49.0		10.0	1	12/15/2017 16:27	WG1053001
Fluoride	1.35		1.00	1	12/15/2017 16:27	WG1053001

Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Mercury	ND		0.0200	1	12/14/2017 19:33	WG1053105

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aluminum	839		10.0	1	12/15/2017 00:53	WG1053295
Antimony	ND		2.00	1	12/15/2017 00:53	WG1053295
Arsenic	15.6		2.00	1	12/15/2017 00:53	WG1053295
Barium	8.57		0.500	1	12/15/2017 00:53	WG1053295
Beryllium	ND		0.200	1	12/15/2017 00:53	WG1053295
Boron	ND		10.0	1	12/15/2017 00:53	WG1053295
Cadmium	ND		0.500	1	12/15/2017 00:53	WG1053295
Calcium	382		100	1	12/15/2017 00:53	WG1053295
Chromium	29.0		1.00	1	12/15/2017 00:53	WG1053295
Cobalt	1.52		1.00	1	12/15/2017 00:53	WG1053295
Copper	ND		2.00	1	12/15/2017 00:53	WG1053295
Iron	6490		10.0	1	12/15/2017 00:53	WG1053295
Lead	3.66		0.500	1	12/15/2017 00:53	WG1053295
Magnesium	ND		100	1	12/15/2017 00:53	WG1053295
Manganese	116		1.00	1	12/15/2017 00:53	WG1053295
Nickel	2.23		2.00	1	12/15/2017 00:53	WG1053295
Potassium	ND		100	1	12/15/2017 00:53	WG1053295
Selenium	ND		2.00	1	12/15/2017 00:53	WG1053295
Silver	ND		1.00	1	12/15/2017 00:53	WG1053295
Sodium	ND		100	1	12/15/2017 00:53	WG1053295
Thallium	ND		2.00	1	12/15/2017 00:53	WG1053295
Vanadium	7.91		2.00	1	12/15/2017 00:53	WG1053295
Zinc	14.5		5.00	1	12/15/2017 00:53	WG1053295

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Ammonia Nitrogen	ND		5.00	1	12/15/2017 14:11	WG1053535

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Bromide	ND		10.0	1	12/15/2017 16:40	WG1053001
Chloride	50.2		10.0	1	12/15/2017 16:40	WG1053001
Fluoride	1.93		1.00	1	12/15/2017 16:40	WG1053001

Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Mercury	ND		0.0200	1	12/14/2017 19:35	WG1053105

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aluminum	830		10.0	1	12/15/2017 00:56	WG1053295
Antimony	ND		2.00	1	12/15/2017 00:56	WG1053295
Arsenic	ND		2.00	1	12/15/2017 00:56	WG1053295
Barium	12.2		0.500	1	12/15/2017 00:56	WG1053295
Beryllium	ND		0.200	1	12/15/2017 00:56	WG1053295
Boron	ND		10.0	1	12/15/2017 00:56	WG1053295
Cadmium	ND		0.500	1	12/15/2017 00:56	WG1053295
Calcium	ND		100	1	12/15/2017 00:56	WG1053295
Chromium	4.88		1.00	1	12/15/2017 00:56	WG1053295
Cobalt	1.28		1.00	1	12/15/2017 00:56	WG1053295
Copper	ND		2.00	1	12/15/2017 00:56	WG1053295
Iron	3170		10.0	1	12/15/2017 00:56	WG1053295
Lead	2.16		0.500	1	12/15/2017 00:56	WG1053295
Magnesium	ND		100	1	12/15/2017 00:56	WG1053295
Manganese	107		1.00	1	12/15/2017 00:56	WG1053295
Nickel	ND		2.00	1	12/15/2017 00:56	WG1053295
Potassium	ND		100	1	12/15/2017 00:56	WG1053295
Selenium	ND		2.00	1	12/15/2017 00:56	WG1053295
Silver	ND		1.00	1	12/15/2017 00:56	WG1053295
Sodium	ND		100	1	12/15/2017 00:56	WG1053295
Thallium	ND		2.00	1	12/15/2017 00:56	WG1053295
Vanadium	6.21		2.00	1	12/15/2017 00:56	WG1053295
Zinc	11.2		5.00	1	12/15/2017 00:56	WG1053295

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Ammonia Nitrogen	ND		5.00	1	12/15/2017 14:13	WG1053535

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Bromide	ND		10.0	1	12/15/2017 16:54	WG1053001
Chloride	ND		10.0	1	12/15/2017 16:54	WG1053001
Fluoride	ND		1.00	1	12/15/2017 16:54	WG1053001

Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Mercury	ND		0.0200	1	12/14/2017 19:38	WG1053105

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aluminum	468		10.0	1	12/15/2017 01:00	WG1053295
Antimony	ND		2.00	1	12/15/2017 01:00	WG1053295
Arsenic	ND		2.00	1	12/15/2017 01:00	WG1053295
Barium	5.51		0.500	1	12/15/2017 01:00	WG1053295
Beryllium	ND		0.200	1	12/15/2017 01:00	WG1053295
Boron	ND		10.0	1	12/15/2017 01:00	WG1053295
Cadmium	ND		0.500	1	12/15/2017 01:00	WG1053295
Calcium	ND		100	1	12/15/2017 01:00	WG1053295
Chromium	5.58		1.00	1	12/15/2017 01:00	WG1053295
Cobalt	ND		1.00	1	12/15/2017 01:00	WG1053295
Copper	ND		2.00	1	12/15/2017 01:00	WG1053295
Iron	1270		10.0	1	12/15/2017 01:00	WG1053295
Lead	1.40		0.500	1	12/15/2017 01:00	WG1053295
Magnesium	ND		100	1	12/15/2017 01:00	WG1053295
Manganese	83.8		1.00	1	12/15/2017 01:00	WG1053295
Nickel	ND		2.00	1	12/15/2017 01:00	WG1053295
Potassium	ND		100	1	12/15/2017 01:00	WG1053295
Selenium	ND		2.00	1	12/15/2017 01:00	WG1053295
Silver	ND		1.00	1	12/15/2017 01:00	WG1053295
Sodium	ND		100	1	12/15/2017 01:00	WG1053295
Thallium	ND		2.00	1	12/15/2017 01:00	WG1053295
Vanadium	2.50		2.00	1	12/15/2017 01:00	WG1053295
Zinc	5.36		5.00	1	12/15/2017 01:00	WG1053295

Method Blank (MB)

(MB) R3274059-1 12/19/17 09:11

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	3.84	J	1.43	30.0

L957175-05 Original Sample (OS) • Duplicate (DUP)

(OS) L957175-05 12/19/17 09:38 • (DUP) R3274059-5 12/19/17 09:38

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	80.5	78.8	1	2.13		20

L957143-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957143-01 12/19/17 09:17 • (DUP) R3274059-4 12/19/17 09:18

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	ND	24.9	1	3.16	J	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274059-2 12/19/17 09:12 • (LCSD) R3274059-3 12/19/17 09:13

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	159	158	106	105	85-115			0.631	20

Method Blank (MB)

(MB) R3273391-1 12/15/17 12:54

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Ammonia Nitrogen	U		1.57	5.00

L956927-03 Original Sample (OS) • Duplicate (DUP)

(OS) L956927-03 12/15/17 13:01 • (DUP) R3273391-4 12/15/17 13:02

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	U	0.000	1	0		20

L956927-16 Original Sample (OS) • Duplicate (DUP)

(OS) L956927-16 12/15/17 13:23 • (DUP) R3273391-7 12/15/17 13:24

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	U	1.84	1	200	J P1	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273391-2 12/15/17 12:55 • (LCSD) R3273391-3 12/15/17 12:56

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	500	515	510	103	102	90-110			0.976	20

L956927-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L956927-10 12/15/17 13:12 • (MS) R3273391-5 12/15/17 13:13 • (MSD) R3273391-6 12/15/17 13:14

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	500	2.12	382	397	76	78.9	1	80-120	J6	J6	3.73	20

L956927-17 Original Sample (OS) • Matrix Spike (MS)

(OS) L956927-17 12/15/17 13:25 • (MS) R3273391-8 12/15/17 13:26

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	500	3.61	370	73.2	1	80-120	J6

Method Blank (MB)

(MB) R3273440-1 12/15/17 14:06

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Ammonia Nitrogen	U		1.57	5.00

L957175-09 Original Sample (OS) • Duplicate (DUP)

(OS) L957175-09 12/15/17 14:11 • (DUP) R3273440-4 12/15/17 14:12

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.000	1	0		20

L957213-03 Original Sample (OS) • Duplicate (DUP)

(OS) L957213-03 12/15/17 14:28 • (DUP) R3273440-6 12/15/17 14:29

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	3.12	0.000	1	200	P1	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273440-2 12/15/17 14:07 • (LCSD) R3273440-3 12/15/17 14:08

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	500	530	510	106	102	90-110			3.85	20

L957175-10 Original Sample (OS) • Matrix Spike (MS)

(OS) L957175-10 12/15/17 14:13 • (MS) R3273440-5 12/15/17 14:15

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	500	ND	510	102	1	80-120	

L957213-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957213-01 12/15/17 14:39 • (MS) R3273440-7 12/15/17 14:40 • (MSD) R3273440-8 12/15/17 14:41

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	500	2.89	356	293	70.6	58	1	80-120	J6	J6	19.4	20

Method Blank (MB)

(MB) R3274211-1 12/19/17 13:39

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ammonia Nitrogen	U		0.0317	0.100

L957143-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957143-01 12/19/17 13:51 • (DUP) R3274211-4 12/19/17 13:53

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	0.103	0.212	1	69.2	P1	10

L957175-04 Original Sample (OS) • Duplicate (DUP)

(OS) L957175-04 12/19/17 16:03 • (DUP) R3274211-9 12/19/17 16:04

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.000	1	0		10

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274211-2 12/19/17 13:40 • (LCSD) R3274211-3 12/19/17 13:42

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	7.50	7.20	7.27	96	97	90-110			0.995	20

L957143-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L957143-02 12/19/17 14:52 • (MS) R3274211-5 12/19/17 14:53

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	5.00	ND	5.17	103	1	90-110	

L957175-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957175-05 12/19/17 15:20 • (MS) R3274211-6 12/19/17 15:22 • (MSD) R3274211-7 12/19/17 15:23

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	5.00	0.223	5.14	5.26	98.2	101	1	90-110			2.48	20

Method Blank (MB)

(MB) R3273498-1 12/15/17 10:11

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Bromide	U		0.133	10.0
Chloride	1.62	J	0.795	10.0
Fluoride	U		0.261	1.00

L957175-10 Original Sample (OS) • Duplicate (DUP)

(OS) L957175-10 12/15/17 16:54 • (DUP) R3273498-7 12/15/17 17:07

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0		15
Chloride	ND	6.46	1	0		15
Fluoride	ND	0.000	1	0		15

L956974-44 Original Sample (OS) • Duplicate (DUP)

(OS) L956974-44 12/15/17 18:14 • (DUP) R3273498-8 12/15/17 18:28

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0		15
Chloride	50.1	50.2	1	0.142		15
Fluoride	3.75	3.73	1	0.481		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273498-2 12/15/17 10:25 • (LCSD) R3273498-3 12/15/17 10:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromide	200	197	195	98.3	97.3	80-120			1.07	15
Chloride	200	208	206	104	103	80-120			0.762	15
Fluoride	20.0	22.0	21.9	110	109	80-120			0.525	15

L956977-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L956977-01 12/15/17 13:59 • (MS) R3273498-5 12/15/17 14:13 • (MSD) R3273498-6 12/15/17 14:26

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	500	ND	478	491	95.7	98.2	1	80-120			2.6	15
Chloride	500	47.8	537	548	97.8	100	1	80-120			2.13	15
Fluoride	50.0	4.61	48.1	49.3	87	89.4	1	80-120			2.45	15

Method Blank (MB)

(MB) R3273049-1 12/14/17 02:38

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.0099	0.100

L957015-02 Original Sample (OS) • Duplicate (DUP)

(OS) L957015-02 12/14/17 04:05 • (DUP) R3273049-4 12/14/17 04:19

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0		15
Chloride	52.0	51.9	1	0.102		15
Fluoride	0.585	0.585	1	0.0342		15

L957175-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957175-01 12/14/17 06:57 • (DUP) R3273049-7 12/14/17 07:12

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	200	P1	15
Chloride	8.27	8.26	1	0		15
Fluoride	ND	0.0349	1	0	J	15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273049-2 12/14/17 02:52 • (LCSD) R3273049-3 12/14/17 03:07

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromide	40.0	40.0	40.0	100	99.9	80-120			0.183	15
Chloride	40.0	39.7	39.7	99.3	99.3	80-120			0.0818	15
Fluoride	8.00	8.03	8.03	100	100	80-120			0.0237	15

L957015-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957015-02 12/14/17 04:05 • (MS) R3273049-5 12/14/17 04:33 • (MSD) R3273049-6 12/14/17 04:48

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	48.9	44.4	97.8	88.8	1	80-120			9.59	15
Chloride	50.0	52.0	106	97.2	107	90.4	1	80-120	E		8.23	15
Fluoride	5.00	0.585	5.96	5.35	107	95.4	1	80-120			10.7	15

L957175-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L957175-01 12/14/17 06:57 • (MS) R3273049-8 12/14/17 07:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50.0	8.27	60.9	105	1	80-120	
Fluoride	5.00	ND	5.29	105	1	80-120	

Method Blank (MB)

(MB) R3273350-1 12/15/17 08:48

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.000049	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273350-2 12/15/17 08:50 • (LCSD) R3273350-3 12/15/17 08:52

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	0.00288	0.00270	96	89.9	80-120			6.55	20

L957143-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957143-02 12/15/17 08:55 • (MS) R3273350-4 12/15/17 08:57 • (MSD) R3273350-5 12/15/17 08:59

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	ND	0.00289	0.00279	96.4	92.9	1	75-125			3.73	20

Method Blank (MB)

(MB) R3273188-1 12/14/17 20:37

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury,Dissolved	0.000103	J	0.000049	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273188-2 12/14/17 20:39 • (LCSD) R3273188-3 12/14/17 20:42

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	0.00303	0.00301	101	100	80-120			0.652	20

L957143-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957143-02 12/14/17 20:44 • (MS) R3273188-4 12/14/17 20:46 • (MSD) R3273188-5 12/14/17 20:48

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	ND	0.00294	0.00297	98.1	99.1	1	75-125			0.998	20

Method Blank (MB)

(MB) R3273170-1 12/14/17 18:24

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Mercury	0.00699	J	0.0028	0.0200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273170-2 12/14/17 18:27 • (LCSD) R3273170-3 12/14/17 18:29

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.300	0.287	0.281	95.6	93.6	80-120			2.21	20

L957145-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957145-01 12/14/17 18:32 • (MS) R3273170-4 12/14/17 18:34 • (MSD) R3273170-5 12/14/17 18:44

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.300	0.105	0.390	0.248	95	47.4	1	75-125		J3 J6	44.8	20

Method Blank (MB)

(MB) R3273183-1 12/14/17 23:35

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Aluminum	U		3.5	10.0
Antimony	U		0.75	2.00
Arsenic	U		0.65	2.00
Barium	U		0.17	0.500
Beryllium	U		0.07	0.200
Boron	U		1.26	10.0
Cadmium	U		0.07	0.500
Calcium	U		4.63	100
Chromium	U		0.14	1.00
Cobalt	U		0.23	1.00
Copper	U		0.53	2.00
Iron	U		1.41	10.0
Lead	U		0.19	0.500
Magnesium	1.18	J	1.11	100
Manganese	U		0.12	1.00
Nickel	U		0.49	2.00
Potassium	U		10.2	100
Selenium	U		0.74	2.00
Silver	U		0.28	1.00
Sodium	U		9.85	100
Thallium	U		0.65	2.00
Vanadium	U		0.24	2.00
Zinc	U		0.59	5.00

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273183-2 12/14/17 23:38 • (LCSD) R3273183-3 12/14/17 23:41

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	1000	1040	1050	104	105	80-120			0.847	20
Antimony	100	101	102	101	102	80-120			0.648	20
Arsenic	100	104	104	104	104	80-120			0.471	20
Barium	100	108	108	108	108	80-120			0.529	20
Beryllium	100	107	107	107	107	80-120			0.382	20
Boron	100	102	103	102	103	80-120			1.19	20
Cadmium	100	101	101	101	101	80-120			0.832	20
Calcium	1000	1030	1030	103	103	80-120			0.277	20
Chromium	100	102	103	102	103	80-120			0.149	20
Cobalt	100	106	106	106	106	80-120			0.201	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273183-2 12/14/17 23:38 • (LCSD) R3273183-3 12/14/17 23:41

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Copper	100	104	104	104	104	80-120			0.0151	20
Iron	1000	1040	1040	104	104	80-120			0.219	20
Lead	100	102	103	102	103	80-120			0.375	20
Magnesium	1000	1060	1060	106	106	80-120			0.574	20
Manganese	100	101	102	101	102	80-120			0.186	20
Nickel	100	104	105	104	105	80-120			0.226	20
Potassium	1000	1030	1040	103	104	80-120			0.542	20
Selenium	100	100	101	100	101	80-120			0.526	20
Silver	20.0	18.4	18.3	91.8	91.5	80-120			0.315	20
Sodium	1000	1030	1030	103	103	80-120			0.467	20
Thallium	100	101	102	101	102	80-120			0.262	20
Vanadium	100	104	104	104	104	80-120			0.266	20
Zinc	100	104	104	104	104	80-120			0.162	20

L957237-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957237-02 12/14/17 23:44 • (MS) R3273183-6 12/14/17 23:54 • (MSD) R3273183-7 12/14/17 23:57

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	1000	12700	20800	19600	813	693	1	75-125	V	V	5.94	20
Antimony	100	ND	46.0	43.7	46	43.7	1	75-125	J6	J6	4.99	20
Arsenic	100	4.04	95.6	96.5	91.6	92.5	1	75-125			0.913	20
Barium	100	18.6	124	123	105	105	1	75-125			0.0396	20
Beryllium	100	ND	96.2	97.4	96.1	97.3	1	75-125			1.24	20
Boron	100	ND	83.9	83.9	83.9	83.9	1	75-125			0.044	20
Cadmium	100	ND	90.9	91.7	90.9	91.7	1	75-125			0.886	20
Calcium	1000	ND	943	950	91.9	92.6	1	75-125			0.72	20
Chromium	100	27.2	120	124	93.1	96.3	1	75-125			2.63	20
Cobalt	100	ND	101	102	100	101	1	75-125			0.867	20
Copper	100	4.71	104	104	99.3	99.7	1	75-125			0.372	20
Iron	1000	17200	18500	18300	124	104	1	75-125			1.12	20
Lead	100	5.91	103	103	97	97.5	1	75-125			0.574	20
Magnesium	1000	212	1290	1270	107	106	1	75-125			1.26	20
Manganese	100	45.3	141	140	96.2	94.4	1	75-125			1.27	20
Nickel	100	5.29	107	107	102	102	1	75-125			0.16	20
Potassium	1000	383	1500	1480	112	110	1	75-125			1.57	20
Selenium	100	ND	88.9	90.4	88.9	90.4	1	75-125			1.67	20
Silver	20.0	ND	16.9	17.0	84.5	85.1	1	75-125			0.634	20
Sodium	1000	ND	940	949	91.4	92.3	1	75-125			1	20

L957237-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957237-02 12/14/17 23:44 • (MS) R3273183-6 12/14/17 23:54 • (MSD) R3273183-7 12/14/17 23:57

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Thallium	100	ND	91.0	91.7	91	91.7	1	75-125			0.709	20
Vanadium	100	36.8	131	132	93.9	94.9	1	75-125			0.738	20
Zinc	100	10.4	109	109	99	98.9	1	75-125			0.146	20

Method Blank (MB)

(MB) R3274308-1 12/19/17 16:43

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Boron,Dissolved	U		0.0126	0.200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274308-2 12/19/17 16:46 • (LCSD) R3274308-3 12/19/17 16:49

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Boron,Dissolved	1.00	0.975	0.994	97.5	99.4	80-120			1.91	20

L958177-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L958177-02 12/19/17 16:53 • (MS) R3274308-5 12/19/17 16:59 • (MSD) R3274308-6 12/19/17 17:02

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Boron,Dissolved	1.00	ND	1.00	1.01	100	101	1	75-125			0.965	20

Method Blank (MB)

(MB) R3274323-1 12/19/17 16:27

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	0.0194	J	0.0126	0.200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274323-2 12/19/17 16:29 • (LCSD) R3274323-3 12/19/17 16:32

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Boron	1.00	1.01	0.955	101	95.5	80-120			5.34	20

L957143-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957143-01 12/19/17 16:35 • (MS) R3274323-5 12/19/17 16:40 • (MSD) R3274323-6 12/19/17 16:42

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1.00	ND	0.995	1.01	97.2	98.2	1	75-125			0.973	20

Method Blank (MB)

(MB) R3274363-2 12/19/17 18:55

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum,Dissolved	0.00832	J	0.00515	0.100
Antimony,Dissolved	U		0.000754	0.00200
Arsenic,Dissolved	U		0.00025	0.00200
Barium,Dissolved	U		0.00036	0.00500
Beryllium,Dissolved	U		0.00012	0.00200
Cadmium,Dissolved	U		0.00016	0.00100
Calcium,Dissolved	U		0.046	1.00
Chromium,Dissolved	0.000668	J	0.00054	0.00200
Copper,Dissolved	0.000642	J	0.00052	0.00500
Cobalt,Dissolved	U		0.00026	0.00200
Iron,Dissolved	U		0.015	0.100
Lead,Dissolved	U		0.00024	0.00200
Magnesium,Dissolved	U		0.1	1.00
Manganese,Dissolved	0.000863	J	0.00025	0.00500
Nickel,Dissolved	0.000547	J	0.00035	0.00200
Potassium,Dissolved	U		0.037	1.00
Selenium,Dissolved	U		0.00038	0.00200
Silver,Dissolved	U		0.00031	0.00200
Sodium,Dissolved	U		0.11	1.00
Thallium,Dissolved	U		0.00019	0.00200
Vanadium,Dissolved	0.000544	J	0.00018	0.00500
Zinc,Dissolved	U		0.00256	0.0250

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274363-3 12/19/17 18:58 • (LCSD) R3274363-4 12/19/17 19:02

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	5.48	5.25	110	105	80-120			4.21	20
Antimony,Dissolved	0.0500	0.0552	0.0544	110	109	80-120			1.44	20
Arsenic,Dissolved	0.0500	0.0537	0.0528	107	106	80-120			1.75	20
Barium,Dissolved	0.0500	0.0498	0.0475	99.6	95	80-120			4.75	20
Beryllium,Dissolved	0.0500	0.0480	0.0467	96	93.4	80-120			2.8	20
Cadmium,Dissolved	0.0500	0.0494	0.0480	98.8	96.1	80-120			2.76	20
Calcium,Dissolved	5.00	5.18	4.99	104	99.8	80-120			3.67	20
Chromium,Dissolved	0.0500	0.0520	0.0509	104	102	80-120			2.17	20
Copper,Dissolved	0.0500	0.0553	0.0534	111	107	80-120			3.57	20
Cobalt,Dissolved	0.0500	0.0526	0.0516	105	103	80-120			1.9	20
Iron,Dissolved	5.00	5.46	5.31	109	106	80-120			2.82	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274363-3 12/19/17 18:58 • (LCSD) R3274363-4 12/19/17 19:02

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead,Dissolved	0.0500	0.0516	0.0500	103	100	80-120			3.07	20
Magnesium,Dissolved	5.00	5.34	5.15	107	103	80-120			3.65	20
Manganese,Dissolved	0.0500	0.0509	0.0497	102	99.4	80-120			2.48	20
Nickel,Dissolved	0.0500	0.0529	0.0522	106	104	80-120			1.35	20
Potassium,Dissolved	5.00	5.37	5.19	107	104	80-120			3.42	20
Selenium,Dissolved	0.0500	0.0505	0.0484	101	96.9	80-120			4.24	20
Silver,Dissolved	0.0500	0.0504	0.0495	101	99.1	80-120			1.8	20
Sodium,Dissolved	5.00	5.34	5.15	107	103	80-120			3.53	20
Thallium,Dissolved	0.0500	0.0526	0.0507	105	101	80-120			3.65	20
Vanadium,Dissolved	0.0500	0.0505	0.0496	101	99.3	80-120			1.78	20
Zinc,Dissolved	0.0500	0.0530	0.0520	106	104	80-120			1.83	20

L957195-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957195-01 12/19/17 19:06 • (MS) R3274363-6 12/19/17 19:13 • (MSD) R3274363-7 12/19/17 19:17

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	U	5.38	5.24	108	105	1	75-125			2.49	20
Antimony,Dissolved	0.0500	0.00112	0.0582	0.0558	114	109	1	75-125			4.16	20
Arsenic,Dissolved	0.0500	0.0142	0.0667	0.0645	105	101	1	75-125			3.29	20
Barium,Dissolved	0.0500	0.106	0.156	0.154	99.3	96.2	1	75-125			0.995	20
Beryllium,Dissolved	0.0500	U	0.0474	0.0452	94.8	90.5	1	75-125			4.64	20
Cadmium,Dissolved	0.0500	U	0.0509	0.0486	102	97.1	1	75-125			4.62	20
Calcium,Dissolved	5.00	95.7	102	101	121	114	1	75-125			0.351	20
Chromium,Dissolved	0.0500	U	0.0506	0.0483	101	96.7	1	75-125			4.46	20
Copper,Dissolved	0.0500	0.00176	0.0529	0.0503	102	97.1	1	75-125			5.04	20
Cobalt,Dissolved	0.0500	0.000367	0.0513	0.0484	102	96	1	75-125			5.93	20
Potassium,Dissolved	5.00	17.8	23.1	23.1	105	107	1	75-125			0.32	20
Iron,Dissolved	5.00	U	5.33	5.06	107	101	1	75-125			5.05	20
Lead,Dissolved	0.0500	0.000326	0.0519	0.0496	103	98.5	1	75-125			4.57	20
Magnesium,Dissolved	5.00	40.5	45.7	45.6	106	102	1	75-125			0.378	20
Manganese,Dissolved	0.0500	0.0884	0.137	0.134	98.1	91.4	1	75-125			2.44	20
Nickel,Dissolved	0.0500	0.00315	0.0532	0.0512	100	96.2	1	75-125			3.86	20
Silver,Dissolved	0.0500	U	0.0498	0.0474	99.7	94.9	1	75-125			4.95	20
Sodium,Dissolved	5.00	110	115	115	89.1	102	1	75-125			0.563	20
Thallium,Dissolved	0.0500	U	0.0530	0.0508	106	102	1	75-125			4.23	20
Vanadium,Dissolved	0.0500	0.00185	0.0520	0.0499	100	96	1	75-125			4.27	20
Zinc,Dissolved	0.0500	0.00332	0.0519	0.0491	97.2	91.7	1	75-125			5.47	20

Method Blank (MB)

(MB) R3274036-1 12/18/17 21:27

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	U		0.00515	0.100
Antimony	U		0.000754	0.00200
Arsenic	U		0.00025	0.00200
Barium	U		0.00036	0.00500
Beryllium	U		0.00012	0.00200
Cadmium	U		0.00016	0.00100
Calcium	U		0.046	1.00
Chromium	U		0.00054	0.00200
Copper	U		0.00052	0.00500
Cobalt	U		0.00026	0.00200
Iron	U		0.015	0.100
Lead	0.000302	J	0.00024	0.00200
Magnesium	U		0.1	1.00
Manganese	U		0.00025	0.00500
Nickel	U		0.00035	0.00200
Potassium	U		0.037	1.00
Selenium	U		0.00038	0.00200
Silver	U		0.00031	0.00200
Sodium	U		0.11	1.00
Thallium	U		0.00019	0.00200
Vanadium	0.000319	J	0.00018	0.00500
Zinc	U		0.00256	0.0250

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274036-2 12/18/17 21:31 • (LCSD) R3274036-3 12/18/17 21:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	4.85	4.85	97.1	97	80-120			0.0783	20
Antimony	0.0500	0.0542	0.0543	108	109	80-120			0.152	20
Arsenic	0.0500	0.0508	0.0510	102	102	80-120			0.457	20
Barium	0.0500	0.0476	0.0485	95.2	96.9	80-120			1.79	20
Beryllium	0.0500	0.0490	0.0489	97.9	97.8	80-120			0.0849	20
Cadmium	0.0500	0.0484	0.0483	96.9	96.6	80-120			0.239	20
Calcium	5.00	4.95	4.99	99.1	99.7	80-120			0.634	20
Chromium	0.0500	0.0507	0.0507	101	101	80-120			0.0485	20
Copper	0.0500	0.0525	0.0519	105	104	80-120			1.02	20
Cobalt	0.0500	0.0520	0.0520	104	104	80-120			0.123	20
Iron	5.00	5.11	5.12	102	102	80-120			0.172	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274036-2 12/18/17 21:31 • (LCSD) R3274036-3 12/18/17 21:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead	0.0500	0.0495	0.0495	98.9	99	80-120			0.0341	20
Magnesium	5.00	5.14	5.13	103	103	80-120			0.0639	20
Manganese	0.0500	0.0489	0.0493	97.7	98.7	80-120			0.988	20
Nickel	0.0500	0.0519	0.0518	104	104	80-120			0.304	20
Potassium	5.00	5.18	5.21	104	104	80-120			0.616	20
Selenium	0.0500	0.0494	0.0493	98.7	98.6	80-120			0.168	20
Silver	0.0500	0.0508	0.0509	102	102	80-120			0.185	20
Sodium	5.00	5.10	5.08	102	102	80-120			0.424	20
Thallium	0.0500	0.0494	0.0499	98.8	99.8	80-120			0.993	20
Vanadium	0.0500	0.0493	0.0496	98.7	99.2	80-120			0.51	20
Zinc	0.0500	0.0512	0.0522	102	104	80-120			1.89	20

L957205-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957205-02 12/18/17 21:39 • (MS) R3274036-5 12/18/17 21:46 • (MSD) R3274036-6 12/18/17 21:50

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	ND	5.06	4.96	99.7	97.9	1	75-125			1.88	20
Antimony	0.0500	ND	0.0571	0.0558	114	112	1	75-125			2.27	20
Arsenic	0.0500	0.00380	0.0543	0.0529	101	98.1	1	75-125			2.6	20
Barium	0.0500	0.0218	0.0723	0.0712	101	98.8	1	75-125			1.57	20
Beryllium	0.0500	ND	0.0496	0.0489	99.3	97.9	1	75-125			1.43	20
Cadmium	0.0500	ND	0.0531	0.0514	106	103	1	75-125			3.29	20
Calcium	5.00	88.7	95.5	93.4	135	93.9	1	75-125	V		2.19	20
Chromium	0.0500	ND	0.0523	0.0513	102	99.8	1	75-125			1.77	20
Copper	0.0500	0.00810	0.0585	0.0573	101	98.3	1	75-125			2.21	20
Cobalt	0.0500	ND	0.0517	0.0504	103	101	1	75-125			2.55	20
Potassium	5.00	8.33	13.6	13.5	105	103	1	75-125			0.792	20
Iron	5.00	0.193	5.30	5.20	102	100	1	75-125			1.89	20
Lead	0.0500	ND	0.0519	0.0509	103	101	1	75-125			1.83	20
Magnesium	5.00	21.9	27.1	26.9	104	100	1	75-125			0.763	20
Manganese	0.0500	0.0116	0.0612	0.0603	99.1	97.5	1	75-125			1.4	20
Nickel	0.0500	ND	0.0512	0.0496	101	97.6	1	75-125			3.03	20
Selenium	0.0500	0.0479	0.104	0.103	112	110	1	75-125			0.708	20
Silver	0.0500	ND	0.0510	0.0498	102	99.6	1	75-125			2.35	20
Sodium	5.00	503	512	508	166	96.1	1	75-125	V		0.684	20
Thallium	0.0500	ND	0.0522	0.0516	104	103	1	75-125			1.08	20
Vanadium	0.0500	0.00603	0.0582	0.0567	104	101	1	75-125			2.49	20
Zinc	0.0500	ND	0.0532	0.0481	106	96.1	1	75-125			10.2	20

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
V	The sample concentration is too high to evaluate accurate spike recoveries.

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.**
***** Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina [1]	DW21704
Florida	E87487	North Carolina [2]	41
Georgia	NELAP	North Dakota	R-140
Georgia [1]	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky [1]	90010	South Dakota	n/a
Kentucky [2]	16	Tennessee [1 4]	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

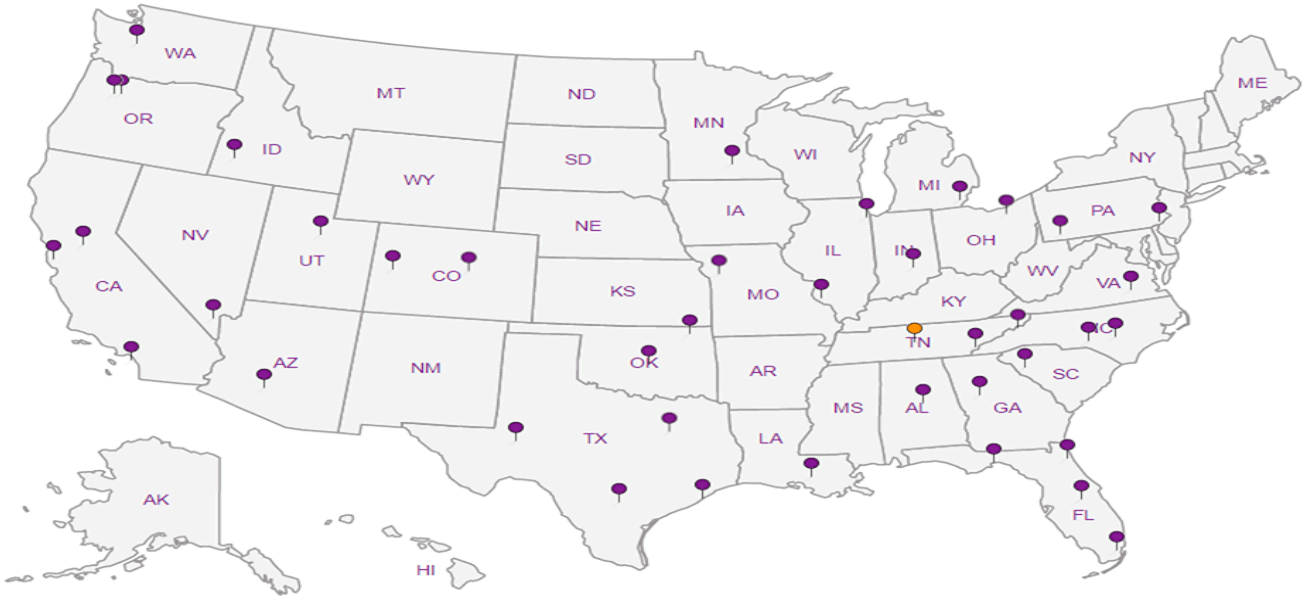
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [n/a] Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Report to: **Philip Campbell**

Email To: **mjohnson@cecinc.com,pcampbell@cecinc.com,kcl**

Project Description: **EWS Landfill**

City/State Collected:

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **142-059**

Lab Project # **CEC-142-059**

Collected by (print): Cole Liggett, Caleb Dike

Site/Facility ID #

P.O. #

Collected by (signature): Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Bromide, Cl, F 125mlHDPE-NoPres	Bromide, Cl, F 4ozClr-NoPres	Diss. Metals 250mlHDPE-NoPres	NH3 125mlHDPE-H2SO4	Total Metals + HARD 250mlHDPE-HNO3	Total Metals 2ozClr-NoPres	Total Metals+ HARD 250mlHDPE-HNO3				Remarks	Sample # (lab only)
CHARLIE CREEK US	Grab	GW		12-11-17	2:00	4	X		X	X	X							-01
CHARLIE CREEK MS		GW			12:50	4	X		X	X			X					-02
CANE CREEK US		GW			1:30	4	X		X	X	X							-03
CANE CREEK MS		GW			12:10	4	X		X	X	X							-04
CANE CREEK DS-1		GW			11:35	4	X		X	X	X							-05
CHARLIE CREEK US		SS			2:00	2		X				X						-06
CHARLIE CREEK MS		SS			12:50	2		X				X						-07
CANE CREEK US		SS			1:30	2		X				X						-08
CANE CREEK MS		SS			12:10	2		X				X						-09
CANE CREEK DS-1		SS			11:35	2		X				X						-10

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____
Flow _____ Other _____

Samples returned via: __ UPS __ FedEx __ Courier X CAR

Tracking #

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Philip Campbell	12-12-17	18:00	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature) 803

Trip Blank Received: Yes / No HCL / MeoH TBR

Temp: 3.1 °C Bottles Received: 30

Date: 12/13/17 Time: 0845

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

If preservation required by Login: Date/Time

Hold: Condition: NCF / OK

Chain of Custody Page ___ of ___

ESC LABORATORY SCIENCES
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12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 957175
B047

Acctnum: CEC
Template: T128179
Prelogin: P628650
TSR: 341 - John Hawkins
PB: HS 11-29-17

Shipped Via: FedEX Ground

ANALYTICAL REPORT

December 20, 2017

Civil & Environmental Consultants - TN

Sample Delivery Group:	L957175
Samples Received:	12/13/2017
Project Number:	142-059
Description:	EWS Landfill Sediment & Stream Sampling

Report To: Philip Campbell
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Entire Report Reviewed By:

John Hawkins
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

Cp: Cover Page 1
Tc: Table of Contents 2
Ss: Sample Summary 3
Cn: Case Narrative 6
Sr: Sample Results 7
CHARLIE CREEK US L957175-01 7
CHARLIE CREEK MS L957175-02 9
CANE CREEK US L957175-03 11
CANE CREEK MS L957175-04 13
CANE CREEK DS-1 L957175-05 15
CHARLIE CREEK US L957175-06 17
CHARLIE CREEK MS L957175-07 18
CANE CREEK US L957175-08 19
CANE CREEK MS L957175-09 20
CANE CREEK DS-1 L957175-10 21
Qc: Quality Control Summary 22
Wet Chemistry by Method 130.1 22
Wet Chemistry by Method 350.1 23
Wet Chemistry by Method 9056A 26
Mercury by Method 7470A 30
Mercury by Method 7471A 32
Metals (ICP) by Method 6010B 33
Metals (ICPMS) by Method 6020 38
Gl: Glossary of Terms 42
Al: Accreditations & Locations 43
Sc: Sample Chain of Custody 44

CHARLIE CREEK US L957175-01 GW

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 14:00 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:34	12/19/17 09:34	KK
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 15:12	12/19/17 15:12	JER
Wet Chemistry by Method 9056A	WG1053253	1	12/14/17 06:57	12/14/17 06:57	KCF
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:36	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:20	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 17:48	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 17:15	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 21:39	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 14:44	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 22:48	LAT
Metals (ICPMS) by Method 6020	WG1053414	10	12/15/17 09:46	12/19/17 13:19	RDS

CHARLIE CREEK MS L957175-02 GW

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 12:50 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:35	12/19/17 09:35	KK
Wet Chemistry by Method 350.1	WG1053808	5	12/19/17 15:14	12/19/17 15:14	JER
Wet Chemistry by Method 9056A	WG1053253	1	12/14/17 07:41	12/14/17 07:41	MAJ
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:38	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:23	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 17:51	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 17:18	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 21:43	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 14:47	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 22:52	LAT
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/19/17 13:01	LAT

CANE CREEK US L957175-03 GW

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 13:30 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:36	12/19/17 09:36	KK
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 15:16	12/19/17 15:16	JER
Wet Chemistry by Method 9056A	WG1053253	1	12/14/17 07:55	12/14/17 07:55	MAJ
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:45	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:25	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 17:54	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 17:20	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 21:47	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 15:10	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 22:56	LAT
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/19/17 13:05	LAT

CANE CREEK MS L957175-04 GW

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 12:10 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:37	12/19/17 09:37	KK
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 16:03	12/19/17 16:03	JER
Wet Chemistry by Method 9056A	WG1053253	1	12/14/17 08:10	12/14/17 08:10	MAJ
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:47	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:34	ABL

CANE CREEK MS L957175-04 GW

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 12:10 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 18:04	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 17:23	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 21:50	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 15:14	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 23:45	LAT

CANE CREEK DS-1 L957175-05 GW

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 11:35 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 130.1	WG1054865	1	12/19/17 09:38	12/19/17 09:38	KK
Wet Chemistry by Method 350.1	WG1053808	1	12/19/17 15:20	12/19/17 15:20	JER
Wet Chemistry by Method 9056A	WG1053253	1	12/14/17 08:53	12/14/17 08:53	MAJ
Mercury by Method 7470A	WG1053452	1	12/14/17 20:21	12/15/17 09:49	ABL
Mercury by Method 7470A	WG1053454	1	12/14/17 11:03	12/14/17 21:37	ABL
Metals (ICP) by Method 6010B	WG1055151	1	12/19/17 11:09	12/19/17 18:08	ST
Metals (ICP) by Method 6010B	WG1055156	1	12/19/17 12:27	12/19/17 17:31	ST
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/19/17 21:54	JPD
Metals (ICPMS) by Method 6020	WG1053312	1	12/16/17 07:02	12/20/17 15:18	JPD
Metals (ICPMS) by Method 6020	WG1053414	1	12/15/17 09:46	12/18/17 23:49	LAT

CHARLIE CREEK US L957175-06 Solid

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 14:00 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG1053006	1	12/13/17 15:42	12/15/17 13:28	KK
Wet Chemistry by Method 9056A	WG1053001	1	12/13/17 16:30	12/15/17 16:00	KCF
Mercury by Method 7471A	WG1053105	1	12/14/17 12:30	12/14/17 19:28	EL
Metals (ICP) by Method 6010B	WG1053295	1	12/13/17 18:37	12/15/17 00:40	ST

CHARLIE CREEK MS L957175-07 Solid

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 12:50 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG1053006	1	12/13/17 15:42	12/15/17 13:30	KK
Wet Chemistry by Method 9056A	WG1053001	1	12/13/17 16:30	12/15/17 16:13	KCF
Mercury by Method 7471A	WG1053105	1	12/14/17 12:30	12/14/17 19:30	EL
Metals (ICP) by Method 6010B	WG1053295	1	12/13/17 18:37	12/15/17 00:43	ST

CANE CREEK US L957175-08 Solid

Collected by: C. L./ C. D. | Collected date/time: 12/11/17 13:30 | Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG1053535	1	12/14/17 11:57	12/15/17 14:10	KK
Wet Chemistry by Method 9056A	WG1053001	1	12/13/17 16:30	12/15/17 16:27	KCF
Mercury by Method 7471A	WG1053105	1	12/14/17 12:30	12/14/17 19:33	EL
Metals (ICP) by Method 6010B	WG1053295	1	12/13/17 18:37	12/15/17 00:53	ST

CANE CREEK MS L957175-09 Solid

Collected by: C. L./ C. D.
Collected date/time: 12/11/17 12:10
Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG1053535	1	12/14/17 11:57	12/15/17 14:11	KK
Wet Chemistry by Method 9056A	WG1053001	1	12/13/17 16:30	12/15/17 16:40	KCF
Mercury by Method 7471A	WG1053105	1	12/14/17 12:30	12/14/17 19:35	EL
Metals (ICP) by Method 6010B	WG1053295	1	12/13/17 18:37	12/15/17 00:56	ST

CANE CREEK DS-1 L957175-10 Solid

Collected by: C. L./ C. D.
Collected date/time: 12/11/17 11:35
Received date/time: 12/13/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG1053535	1	12/14/17 11:57	12/15/17 14:13	KK
Wet Chemistry by Method 9056A	WG1053001	1	12/13/17 16:30	12/15/17 16:54	KCF
Mercury by Method 7471A	WG1053105	1	12/14/17 12:30	12/14/17 19:38	EL
Metals (ICP) by Method 6010B	WG1053295	1	12/13/17 18:37	12/15/17 01:00	ST

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

John Hawkins
Technical Service Representative

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	46.6		30.0	1	12/19/2017 09:34	WG1054865

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	2.06		0.100	1	12/19/2017 15:12	WG1053808

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND	P1	1.00	1	12/14/2017 06:57	WG1053253
Chloride	8.27		1.00	1	12/14/2017 06:57	WG1053253
Fluoride	ND		0.100	1	12/14/2017 06:57	WG1053253

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:36	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:20	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 17:15	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 17:48	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		1.00	10	12/19/2017 13:19	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 21:39	WG1053312
Antimony	ND		0.00200	1	12/18/2017 22:48	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Arsenic	ND		0.0200	10	12/19/2017 13:19	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Barium	0.0284		0.00500	1	12/18/2017 22:48	WG1053414
Barium,Dissolved	0.0297		0.00500	1	12/19/2017 21:39	WG1053312
Beryllium	ND		0.0200	10	12/19/2017 13:19	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 14:44	WG1053312
Cadmium	0.00375		0.00100	1	12/18/2017 22:48	WG1053414
Cadmium,Dissolved	0.00227		0.00100	1	12/20/2017 14:44	WG1053312
Calcium	10.9		10.0	10	12/19/2017 13:19	WG1053414
Calcium,Dissolved	12.2		1.00	1	12/19/2017 21:39	WG1053312
Chromium	ND		0.0200	10	12/19/2017 13:19	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Cobalt	ND		0.0200	10	12/19/2017 13:19	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Copper	ND		0.0500	10	12/19/2017 13:19	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 21:39	WG1053312
Iron	ND		1.00	10	12/19/2017 13:19	WG1053414
Iron,Dissolved	0.111		0.100	1	12/19/2017 21:39	WG1053312
Lead	ND		0.00200	1	12/18/2017 22:48	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	ND		10.0	10	12/19/2017 13:19	WG1053414
Magnesium,Dissolved	2.53		1.00	1	12/19/2017 21:39	WG1053312
Manganese	0.128		0.0500	10	12/19/2017 13:19	WG1053414
Manganese,Dissolved	0.130		0.00500	1	12/19/2017 21:39	WG1053312
Nickel	ND		0.0200	10	12/19/2017 13:19	WG1053414
Nickel,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Potassium	ND		10.0	10	12/19/2017 13:19	WG1053414
Potassium,Dissolved	1.56		1.00	1	12/20/2017 14:44	WG1053312
Selenium	ND		0.00200	1	12/18/2017 22:48	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Silver	ND		0.00200	1	12/18/2017 22:48	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Sodium	ND		10.0	10	12/19/2017 13:19	WG1053414
Sodium,Dissolved	6.92		1.00	1	12/19/2017 21:39	WG1053312
Thallium	ND		0.00200	1	12/18/2017 22:48	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 21:39	WG1053312
Vanadium	ND		0.0500	10	12/19/2017 13:19	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 21:39	WG1053312
Zinc	ND		0.250	10	12/19/2017 13:19	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 21:39	WG1053312

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	54.9		30.0	1	12/19/2017 09:35	WG1054865

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	10.1		0.500	5	12/19/2017 15:14	WG1053808

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/14/2017 07:41	WG1053253
Chloride	10.9		1.00	1	12/14/2017 07:41	WG1053253
Fluoride	ND		0.100	1	12/14/2017 07:41	WG1053253

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:38	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:23	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 17:18	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 17:51	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	12/19/2017 13:01	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 21:43	WG1053312
Antimony	ND		0.00200	1	12/18/2017 22:52	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Arsenic	ND		0.00200	1	12/19/2017 13:01	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Barium	0.0312		0.00500	1	12/18/2017 22:52	WG1053414
Barium,Dissolved	0.0331		0.00500	1	12/19/2017 21:43	WG1053312
Beryllium	ND		0.00200	1	12/19/2017 13:01	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 14:47	WG1053312
Cadmium	0.00200		0.00100	1	12/18/2017 22:52	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/20/2017 14:47	WG1053312
Calcium	13.2		1.00	1	12/19/2017 13:01	WG1053414
Calcium,Dissolved	14.8		1.00	1	12/19/2017 21:43	WG1053312
Chromium	ND		0.00200	1	12/19/2017 13:01	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Cobalt	ND		0.00200	1	12/19/2017 13:01	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Copper	0.00516		0.00500	1	12/18/2017 22:52	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 21:43	WG1053312
Iron	0.417		0.100	1	12/19/2017 13:01	WG1053414
Iron,Dissolved	0.121		0.100	1	12/19/2017 21:43	WG1053312
Lead	ND		0.00200	1	12/18/2017 22:52	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	2.82		1.00	1	12/19/2017 13:01	WG1053414
Magnesium,Dissolved	3.08		1.00	1	12/19/2017 21:43	WG1053312
Manganese	0.317		0.00500	1	12/19/2017 13:01	WG1053414
Manganese,Dissolved	0.349		0.00500	1	12/19/2017 21:43	WG1053312
Nickel	ND		0.00200	1	12/19/2017 13:01	WG1053414
Nickel,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Potassium	1.57		1.00	1	12/19/2017 13:01	WG1053414
Potassium,Dissolved	1.72		1.00	1	12/20/2017 14:47	WG1053312
Selenium	ND		0.00200	1	12/18/2017 22:52	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Silver	ND		0.00200	1	12/18/2017 22:52	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Sodium	6.39		1.00	1	12/19/2017 13:01	WG1053414
Sodium,Dissolved	7.34		1.00	1	12/19/2017 21:43	WG1053312
Thallium	ND		0.00200	1	12/18/2017 22:52	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 21:43	WG1053312
Vanadium	ND		0.00500	1	12/19/2017 13:01	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 21:43	WG1053312
Zinc	ND		0.0250	1	12/19/2017 13:01	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 21:43	WG1053312

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	89.5		30.0	1	12/19/2017 09:36	WG1054865

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	0.266		0.100	1	12/19/2017 15:16	WG1053808

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/14/2017 07:55	WG1053253
Chloride	11.4		1.00	1	12/14/2017 07:55	WG1053253
Fluoride	ND		0.100	1	12/14/2017 07:55	WG1053253

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:45	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:25	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 17:20	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 17:54	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	12/19/2017 13:05	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 21:47	WG1053312
Antimony	ND		0.00200	1	12/18/2017 22:56	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312
Arsenic	ND		0.00200	1	12/18/2017 22:56	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312
Barium	0.0340		0.00500	1	12/18/2017 22:56	WG1053414
Barium,Dissolved	0.0325		0.00500	1	12/19/2017 21:47	WG1053312
Beryllium	ND		0.00200	1	12/18/2017 22:56	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 15:10	WG1053312
Cadmium	ND		0.00100	1	12/18/2017 22:56	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/20/2017 15:10	WG1053312
Calcium	18.1		1.00	1	12/19/2017 13:05	WG1053414
Calcium,Dissolved	20.3		1.00	1	12/19/2017 21:47	WG1053312
Chromium	ND		0.00200	1	12/18/2017 22:56	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312
Cobalt	0.00226		0.00200	1	12/18/2017 22:56	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312
Copper	ND		0.00500	1	12/18/2017 22:56	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 21:47	WG1053312
Iron	0.920		0.100	1	12/18/2017 22:56	WG1053414
Iron,Dissolved	0.121		0.100	1	12/19/2017 21:47	WG1053312
Lead	ND		0.00200	1	12/18/2017 22:56	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	6.29		1.00	1	12/19/2017 13:05	WG1053414
Magnesium,Dissolved	6.82		1.00	1	12/19/2017 21:47	WG1053312
Manganese	0.735		0.00500	1	12/18/2017 22:56	WG1053414
Manganese,Dissolved	0.474		0.00500	1	12/19/2017 21:47	WG1053312
Nickel	0.00409		0.00200	1	12/18/2017 22:56	WG1053414
Nickel,Dissolved	0.00340	B	0.00200	1	12/19/2017 21:47	WG1053312
Potassium	2.33		1.00	1	12/19/2017 13:05	WG1053414
Potassium,Dissolved	2.46		1.00	1	12/20/2017 15:10	WG1053312
Selenium	ND		0.00200	1	12/18/2017 22:56	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312
Silver	ND		0.00200	1	12/18/2017 22:56	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312
Sodium	8.23		1.00	1	12/19/2017 13:05	WG1053414
Sodium,Dissolved	9.26		1.00	1	12/19/2017 21:47	WG1053312
Thallium	ND		0.00200	1	12/18/2017 22:56	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 21:47	WG1053312
Vanadium	ND		0.00500	1	12/18/2017 22:56	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 21:47	WG1053312
Zinc	ND		0.0250	1	12/18/2017 22:56	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 21:47	WG1053312

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	80.1		30.0	1	12/19/2017 09:37	WG1054865

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	12/19/2017 16:03	WG1053808

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/14/2017 08:10	WG1053253
Chloride	11.6		1.00	1	12/14/2017 08:10	WG1053253
Fluoride	ND		0.100	1	12/14/2017 08:10	WG1053253

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:47	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:34	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 17:23	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 18:04	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	12/18/2017 23:45	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 21:50	WG1053312
Antimony	ND		0.00200	1	12/18/2017 23:45	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312
Arsenic	ND		0.00200	1	12/18/2017 23:45	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312
Barium	0.0331		0.00500	1	12/18/2017 23:45	WG1053414
Barium,Dissolved	0.0345		0.00500	1	12/19/2017 21:50	WG1053312
Beryllium	ND		0.00200	1	12/18/2017 23:45	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 15:14	WG1053312
Cadmium	ND		0.00100	1	12/18/2017 23:45	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/20/2017 15:14	WG1053312
Calcium	18.8		1.00	1	12/18/2017 23:45	WG1053414
Calcium,Dissolved	19.1		1.00	1	12/19/2017 21:50	WG1053312
Chromium	ND		0.00200	1	12/18/2017 23:45	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312
Cobalt	ND		0.00200	1	12/18/2017 23:45	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312
Copper	ND		0.00500	1	12/18/2017 23:45	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 21:50	WG1053312
Iron	0.709		0.100	1	12/18/2017 23:45	WG1053414
Iron,Dissolved	0.134		0.100	1	12/19/2017 21:50	WG1053312
Lead	ND		0.00200	1	12/18/2017 23:45	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	6.00		1.00	1	12/18/2017 23:45	WG1053414
Magnesium,Dissolved	5.74		1.00	1	12/19/2017 21:50	WG1053312
Manganese	0.515		0.00500	1	12/18/2017 23:45	WG1053414
Manganese,Dissolved	0.540		0.00500	1	12/19/2017 21:50	WG1053312
Nickel	0.00300		0.00200	1	12/18/2017 23:45	WG1053414
Nickel,Dissolved	0.00259	B	0.00200	1	12/19/2017 21:50	WG1053312
Potassium	2.17		1.00	1	12/18/2017 23:45	WG1053414
Potassium,Dissolved	2.16		1.00	1	12/20/2017 15:14	WG1053312
Selenium	ND		0.00200	1	12/18/2017 23:45	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312
Silver	ND		0.00200	1	12/18/2017 23:45	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312
Sodium	8.49		1.00	1	12/18/2017 23:45	WG1053414
Sodium,Dissolved	8.69		1.00	1	12/19/2017 21:50	WG1053312
Thallium	ND		0.00200	1	12/18/2017 23:45	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 21:50	WG1053312
Vanadium	ND		0.00500	1	12/18/2017 23:45	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 21:50	WG1053312
Zinc	ND		0.0250	1	12/18/2017 23:45	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 21:50	WG1053312

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	80.5		30.0	1	12/19/2017 09:38	WG1054865

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	0.223		0.100	1	12/19/2017 15:20	WG1053808

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	12/14/2017 08:53	WG1053253
Chloride	12.7		1.00	1	12/14/2017 08:53	WG1053253
Fluoride	ND		0.100	1	12/14/2017 08:53	WG1053253

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	12/15/2017 09:49	WG1053452
Mercury,Dissolved	ND		0.000200	1	12/14/2017 21:37	WG1053454

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	12/19/2017 17:31	WG1055156
Boron,Dissolved	ND		0.200	1	12/19/2017 18:08	WG1055151

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	12/18/2017 23:49	WG1053414
Aluminum,Dissolved	ND		0.100	1	12/19/2017 21:54	WG1053312
Antimony	ND		0.00200	1	12/18/2017 23:49	WG1053414
Antimony,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312
Arsenic	ND		0.00200	1	12/18/2017 23:49	WG1053414
Arsenic,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312
Barium	0.0346		0.00500	1	12/18/2017 23:49	WG1053414
Barium,Dissolved	0.0358		0.00500	1	12/19/2017 21:54	WG1053312
Beryllium	ND		0.00200	1	12/18/2017 23:49	WG1053414
Beryllium,Dissolved	ND		0.00200	1	12/20/2017 15:18	WG1053312
Cadmium	ND		0.00100	1	12/18/2017 23:49	WG1053414
Cadmium,Dissolved	ND		0.00100	1	12/20/2017 15:18	WG1053312
Calcium	18.9		1.00	1	12/18/2017 23:49	WG1053414
Calcium,Dissolved	19.2		1.00	1	12/19/2017 21:54	WG1053312
Chromium	ND		0.00200	1	12/18/2017 23:49	WG1053414
Chromium,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312
Cobalt	ND		0.00200	1	12/18/2017 23:49	WG1053414
Cobalt,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312
Copper	ND		0.00500	1	12/18/2017 23:49	WG1053414
Copper,Dissolved	ND		0.00500	1	12/19/2017 21:54	WG1053312
Iron	0.736		0.100	1	12/18/2017 23:49	WG1053414
Iron,Dissolved	0.168		0.100	1	12/19/2017 21:54	WG1053312
Lead	ND		0.00200	1	12/18/2017 23:49	WG1053414
Lead,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312

Metals (ICPMS) by Method 6020

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Magnesium	5.99		1.00	1	12/18/2017 23:49	WG1053414
Magnesium,Dissolved	5.80		1.00	1	12/19/2017 21:54	WG1053312
Manganese	0.525		0.00500	1	12/18/2017 23:49	WG1053414
Manganese,Dissolved	0.529		0.00500	1	12/19/2017 21:54	WG1053312
Nickel	0.00430		0.00200	1	12/18/2017 23:49	WG1053414
Nickel,Dissolved	0.00264	B	0.00200	1	12/19/2017 21:54	WG1053312
Potassium	2.26		1.00	1	12/18/2017 23:49	WG1053414
Potassium,Dissolved	2.28		1.00	1	12/20/2017 15:18	WG1053312
Selenium	ND		0.00200	1	12/18/2017 23:49	WG1053414
Selenium,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312
Silver	ND		0.00200	1	12/18/2017 23:49	WG1053414
Silver,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312
Sodium	8.76		1.00	1	12/18/2017 23:49	WG1053414
Sodium,Dissolved	9.01		1.00	1	12/19/2017 21:54	WG1053312
Thallium	ND		0.00200	1	12/18/2017 23:49	WG1053414
Thallium,Dissolved	ND		0.00200	1	12/19/2017 21:54	WG1053312
Vanadium	ND		0.00500	1	12/18/2017 23:49	WG1053414
Vanadium,Dissolved	ND		0.00500	1	12/19/2017 21:54	WG1053312
Zinc	ND		0.0250	1	12/18/2017 23:49	WG1053414
Zinc,Dissolved	ND		0.0250	1	12/19/2017 21:54	WG1053312

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Ammonia Nitrogen	ND		5.00	1	12/15/2017 13:28	WG1053006

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Bromide	ND		10.0	1	12/15/2017 16:00	WG1053001
Chloride	44.6		10.0	1	12/15/2017 16:00	WG1053001
Fluoride	1.68		1.00	1	12/15/2017 16:00	WG1053001

Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Mercury	ND		0.0200	1	12/14/2017 19:28	WG1053105

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aluminum	727		10.0	1	12/15/2017 00:40	WG1053295
Antimony	ND		2.00	1	12/15/2017 00:40	WG1053295
Arsenic	ND		2.00	1	12/15/2017 00:40	WG1053295
Barium	7.83		0.500	1	12/15/2017 00:40	WG1053295
Beryllium	ND		0.200	1	12/15/2017 00:40	WG1053295
Boron	ND		10.0	1	12/15/2017 00:40	WG1053295
Cadmium	ND		0.500	1	12/15/2017 00:40	WG1053295
Calcium	ND		100	1	12/15/2017 00:40	WG1053295
Chromium	3.44		1.00	1	12/15/2017 00:40	WG1053295
Cobalt	ND		1.00	1	12/15/2017 00:40	WG1053295
Copper	ND		2.00	1	12/15/2017 00:40	WG1053295
Iron	2370		10.0	1	12/15/2017 00:40	WG1053295
Lead	1.60		0.500	1	12/15/2017 00:40	WG1053295
Magnesium	ND		100	1	12/15/2017 00:40	WG1053295
Manganese	64.7		1.00	1	12/15/2017 00:40	WG1053295
Nickel	ND		2.00	1	12/15/2017 00:40	WG1053295
Potassium	100		100	1	12/15/2017 00:40	WG1053295
Selenium	ND		2.00	1	12/15/2017 00:40	WG1053295
Silver	ND		1.00	1	12/15/2017 00:40	WG1053295
Sodium	ND		100	1	12/15/2017 00:40	WG1053295
Thallium	ND		2.00	1	12/15/2017 00:40	WG1053295
Vanadium	3.95		2.00	1	12/15/2017 00:40	WG1053295
Zinc	5.16		5.00	1	12/15/2017 00:40	WG1053295

Wet Chemistry by Method 350.1

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		5.00	1	12/15/2017 13:30	WG1053006

Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Bromide	ND		10.0	1	12/15/2017 16:13	WG1053001
Chloride	53.8		10.0	1	12/15/2017 16:13	WG1053001
Fluoride	4.39		1.00	1	12/15/2017 16:13	WG1053001

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	12/14/2017 19:30	WG1053105

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Aluminum	1970		10.0	1	12/15/2017 00:43	WG1053295
Antimony	ND		2.00	1	12/15/2017 00:43	WG1053295
Arsenic	ND		2.00	1	12/15/2017 00:43	WG1053295
Barium	16.4		0.500	1	12/15/2017 00:43	WG1053295
Beryllium	ND		0.200	1	12/15/2017 00:43	WG1053295
Boron	ND		10.0	1	12/15/2017 00:43	WG1053295
Cadmium	ND		0.500	1	12/15/2017 00:43	WG1053295
Calcium	226		100	1	12/15/2017 00:43	WG1053295
Chromium	3.42		1.00	1	12/15/2017 00:43	WG1053295
Cobalt	1.36		1.00	1	12/15/2017 00:43	WG1053295
Copper	ND		2.00	1	12/15/2017 00:43	WG1053295
Iron	3300		10.0	1	12/15/2017 00:43	WG1053295
Lead	2.79		0.500	1	12/15/2017 00:43	WG1053295
Magnesium	172		100	1	12/15/2017 00:43	WG1053295
Manganese	122		1.00	1	12/15/2017 00:43	WG1053295
Nickel	ND		2.00	1	12/15/2017 00:43	WG1053295
Potassium	192		100	1	12/15/2017 00:43	WG1053295
Selenium	ND		2.00	1	12/15/2017 00:43	WG1053295
Silver	ND		1.00	1	12/15/2017 00:43	WG1053295
Sodium	ND		100	1	12/15/2017 00:43	WG1053295
Thallium	ND		2.00	1	12/15/2017 00:43	WG1053295
Vanadium	6.10		2.00	1	12/15/2017 00:43	WG1053295
Zinc	12.5		5.00	1	12/15/2017 00:43	WG1053295

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Ammonia Nitrogen	ND		5.00	1	12/15/2017 14:10	WG1053535

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Bromide	ND		10.0	1	12/15/2017 16:27	WG1053001
Chloride	49.0		10.0	1	12/15/2017 16:27	WG1053001
Fluoride	1.35		1.00	1	12/15/2017 16:27	WG1053001

Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Mercury	ND		0.0200	1	12/14/2017 19:33	WG1053105

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aluminum	839		10.0	1	12/15/2017 00:53	WG1053295
Antimony	ND		2.00	1	12/15/2017 00:53	WG1053295
Arsenic	15.6		2.00	1	12/15/2017 00:53	WG1053295
Barium	8.57		0.500	1	12/15/2017 00:53	WG1053295
Beryllium	ND		0.200	1	12/15/2017 00:53	WG1053295
Boron	ND		10.0	1	12/15/2017 00:53	WG1053295
Cadmium	ND		0.500	1	12/15/2017 00:53	WG1053295
Calcium	382		100	1	12/15/2017 00:53	WG1053295
Chromium	29.0		1.00	1	12/15/2017 00:53	WG1053295
Cobalt	1.52		1.00	1	12/15/2017 00:53	WG1053295
Copper	ND		2.00	1	12/15/2017 00:53	WG1053295
Iron	6490		10.0	1	12/15/2017 00:53	WG1053295
Lead	3.66		0.500	1	12/15/2017 00:53	WG1053295
Magnesium	ND		100	1	12/15/2017 00:53	WG1053295
Manganese	116		1.00	1	12/15/2017 00:53	WG1053295
Nickel	2.23		2.00	1	12/15/2017 00:53	WG1053295
Potassium	ND		100	1	12/15/2017 00:53	WG1053295
Selenium	ND		2.00	1	12/15/2017 00:53	WG1053295
Silver	ND		1.00	1	12/15/2017 00:53	WG1053295
Sodium	ND		100	1	12/15/2017 00:53	WG1053295
Thallium	ND		2.00	1	12/15/2017 00:53	WG1053295
Vanadium	7.91		2.00	1	12/15/2017 00:53	WG1053295
Zinc	14.5		5.00	1	12/15/2017 00:53	WG1053295

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Ammonia Nitrogen	ND		5.00	1	12/15/2017 14:11	WG1053535

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Bromide	ND		10.0	1	12/15/2017 16:40	WG1053001
Chloride	50.2		10.0	1	12/15/2017 16:40	WG1053001
Fluoride	1.93		1.00	1	12/15/2017 16:40	WG1053001

Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Mercury	ND		0.0200	1	12/14/2017 19:35	WG1053105

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aluminum	830		10.0	1	12/15/2017 00:56	WG1053295
Antimony	ND		2.00	1	12/15/2017 00:56	WG1053295
Arsenic	ND		2.00	1	12/15/2017 00:56	WG1053295
Barium	12.2		0.500	1	12/15/2017 00:56	WG1053295
Beryllium	ND		0.200	1	12/15/2017 00:56	WG1053295
Boron	ND		10.0	1	12/15/2017 00:56	WG1053295
Cadmium	ND		0.500	1	12/15/2017 00:56	WG1053295
Calcium	ND		100	1	12/15/2017 00:56	WG1053295
Chromium	4.88		1.00	1	12/15/2017 00:56	WG1053295
Cobalt	1.28		1.00	1	12/15/2017 00:56	WG1053295
Copper	ND		2.00	1	12/15/2017 00:56	WG1053295
Iron	3170		10.0	1	12/15/2017 00:56	WG1053295
Lead	2.16		0.500	1	12/15/2017 00:56	WG1053295
Magnesium	ND		100	1	12/15/2017 00:56	WG1053295
Manganese	107		1.00	1	12/15/2017 00:56	WG1053295
Nickel	ND		2.00	1	12/15/2017 00:56	WG1053295
Potassium	ND		100	1	12/15/2017 00:56	WG1053295
Selenium	ND		2.00	1	12/15/2017 00:56	WG1053295
Silver	ND		1.00	1	12/15/2017 00:56	WG1053295
Sodium	ND		100	1	12/15/2017 00:56	WG1053295
Thallium	ND		2.00	1	12/15/2017 00:56	WG1053295
Vanadium	6.21		2.00	1	12/15/2017 00:56	WG1053295
Zinc	11.2		5.00	1	12/15/2017 00:56	WG1053295

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Ammonia Nitrogen	ND		5.00	1	12/15/2017 14:13	WG1053535

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Bromide	ND		10.0	1	12/15/2017 16:54	WG1053001
Chloride	ND		10.0	1	12/15/2017 16:54	WG1053001
Fluoride	ND		1.00	1	12/15/2017 16:54	WG1053001

Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Mercury	ND		0.0200	1	12/14/2017 19:38	WG1053105

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aluminum	468		10.0	1	12/15/2017 01:00	WG1053295
Antimony	ND		2.00	1	12/15/2017 01:00	WG1053295
Arsenic	ND		2.00	1	12/15/2017 01:00	WG1053295
Barium	5.51		0.500	1	12/15/2017 01:00	WG1053295
Beryllium	ND		0.200	1	12/15/2017 01:00	WG1053295
Boron	ND		10.0	1	12/15/2017 01:00	WG1053295
Cadmium	ND		0.500	1	12/15/2017 01:00	WG1053295
Calcium	ND		100	1	12/15/2017 01:00	WG1053295
Chromium	5.58		1.00	1	12/15/2017 01:00	WG1053295
Cobalt	ND		1.00	1	12/15/2017 01:00	WG1053295
Copper	ND		2.00	1	12/15/2017 01:00	WG1053295
Iron	1270		10.0	1	12/15/2017 01:00	WG1053295
Lead	1.40		0.500	1	12/15/2017 01:00	WG1053295
Magnesium	ND		100	1	12/15/2017 01:00	WG1053295
Manganese	83.8		1.00	1	12/15/2017 01:00	WG1053295
Nickel	ND		2.00	1	12/15/2017 01:00	WG1053295
Potassium	ND		100	1	12/15/2017 01:00	WG1053295
Selenium	ND		2.00	1	12/15/2017 01:00	WG1053295
Silver	ND		1.00	1	12/15/2017 01:00	WG1053295
Sodium	ND		100	1	12/15/2017 01:00	WG1053295
Thallium	ND		2.00	1	12/15/2017 01:00	WG1053295
Vanadium	2.50		2.00	1	12/15/2017 01:00	WG1053295
Zinc	5.36		5.00	1	12/15/2017 01:00	WG1053295

Method Blank (MB)

(MB) R3274059-1 12/19/17 09:11

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	3.84	J	1.43	30.0

L957175-05 Original Sample (OS) • Duplicate (DUP)

(OS) L957175-05 12/19/17 09:38 • (DUP) R3274059-5 12/19/17 09:38

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	80.5	78.8	1	2.13		20

L957143-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957143-01 12/19/17 09:17 • (DUP) R3274059-4 12/19/17 09:18

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	ND	24.9	1	3.16	J	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274059-2 12/19/17 09:12 • (LCSD) R3274059-3 12/19/17 09:13

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	159	158	106	105	85-115			0.631	20

Method Blank (MB)

(MB) R3273391-1 12/15/17 12:54

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Ammonia Nitrogen	U		1.57	5.00

L956927-03 Original Sample (OS) • Duplicate (DUP)

(OS) L956927-03 12/15/17 13:01 • (DUP) R3273391-4 12/15/17 13:02

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	U	0.000	1	0		20

L956927-16 Original Sample (OS) • Duplicate (DUP)

(OS) L956927-16 12/15/17 13:23 • (DUP) R3273391-7 12/15/17 13:24

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	U	1.84	1	200	J P1	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273391-2 12/15/17 12:55 • (LCSD) R3273391-3 12/15/17 12:56

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	500	515	510	103	102	90-110			0.976	20

L956927-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L956927-10 12/15/17 13:12 • (MS) R3273391-5 12/15/17 13:13 • (MSD) R3273391-6 12/15/17 13:14

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	500	2.12	382	397	76	78.9	1	80-120	J6	J6	3.73	20

L956927-17 Original Sample (OS) • Matrix Spike (MS)

(OS) L956927-17 12/15/17 13:25 • (MS) R3273391-8 12/15/17 13:26

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	500	3.61	370	73.2	1	80-120	J6

Method Blank (MB)

(MB) R3273440-1 12/15/17 14:06

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Ammonia Nitrogen	U		1.57	5.00

L957175-09 Original Sample (OS) • Duplicate (DUP)

(OS) L957175-09 12/15/17 14:11 • (DUP) R3273440-4 12/15/17 14:12

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.000	1	0		20

L957213-03 Original Sample (OS) • Duplicate (DUP)

(OS) L957213-03 12/15/17 14:28 • (DUP) R3273440-6 12/15/17 14:29

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	3.12	0.000	1	200	P1	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273440-2 12/15/17 14:07 • (LCSD) R3273440-3 12/15/17 14:08

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	500	530	510	106	102	90-110			3.85	20

L957175-10 Original Sample (OS) • Matrix Spike (MS)

(OS) L957175-10 12/15/17 14:13 • (MS) R3273440-5 12/15/17 14:15

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	500	ND	510	102	1	80-120	

L957213-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957213-01 12/15/17 14:39 • (MS) R3273440-7 12/15/17 14:40 • (MSD) R3273440-8 12/15/17 14:41

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	500	2.89	356	293	70.6	58	1	80-120	J6	J6	19.4	20

Method Blank (MB)

(MB) R3274211-1 12/19/17 13:39

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ammonia Nitrogen	U		0.0317	0.100

L957143-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957143-01 12/19/17 13:51 • (DUP) R3274211-4 12/19/17 13:53

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	0.103	0.212	1	69.2	P1	10

L957175-04 Original Sample (OS) • Duplicate (DUP)

(OS) L957175-04 12/19/17 16:03 • (DUP) R3274211-9 12/19/17 16:04

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.000	1	0		10

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274211-2 12/19/17 13:40 • (LCSD) R3274211-3 12/19/17 13:42

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	7.50	7.20	7.27	96	97	90-110			0.995	20

L957143-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L957143-02 12/19/17 14:52 • (MS) R3274211-5 12/19/17 14:53

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	5.00	ND	5.17	103	1	90-110	

L957175-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957175-05 12/19/17 15:20 • (MS) R3274211-6 12/19/17 15:22 • (MSD) R3274211-7 12/19/17 15:23

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	5.00	0.223	5.14	5.26	98.2	101	1	90-110			2.48	20

Method Blank (MB)

(MB) R3273498-1 12/15/17 10:11

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Bromide	U		0.133	10.0
Chloride	1.62	J	0.795	10.0
Fluoride	U		0.261	1.00

L957175-10 Original Sample (OS) • Duplicate (DUP)

(OS) L957175-10 12/15/17 16:54 • (DUP) R3273498-7 12/15/17 17:07

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0		15
Chloride	ND	6.46	1	0		15
Fluoride	ND	0.000	1	0		15

L956974-44 Original Sample (OS) • Duplicate (DUP)

(OS) L956974-44 12/15/17 18:14 • (DUP) R3273498-8 12/15/17 18:28

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0		15
Chloride	50.1	50.2	1	0.142		15
Fluoride	3.75	3.73	1	0.481		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273498-2 12/15/17 10:25 • (LCSD) R3273498-3 12/15/17 10:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromide	200	197	195	98.3	97.3	80-120			1.07	15
Chloride	200	208	206	104	103	80-120			0.762	15
Fluoride	20.0	22.0	21.9	110	109	80-120			0.525	15

L956977-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L956977-01 12/15/17 13:59 • (MS) R3273498-5 12/15/17 14:13 • (MSD) R3273498-6 12/15/17 14:26

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	500	ND	478	491	95.7	98.2	1	80-120			2.6	15
Chloride	500	47.8	537	548	97.8	100	1	80-120			2.13	15
Fluoride	50.0	4.61	48.1	49.3	87	89.4	1	80-120			2.45	15

Method Blank (MB)

(MB) R3273049-1 12/14/17 02:38

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.0099	0.100

L957015-02 Original Sample (OS) • Duplicate (DUP)

(OS) L957015-02 12/14/17 04:05 • (DUP) R3273049-4 12/14/17 04:19

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0		15
Chloride	52.0	51.9	1	0.102		15
Fluoride	0.585	0.585	1	0.0342		15

L957175-01 Original Sample (OS) • Duplicate (DUP)

(OS) L957175-01 12/14/17 06:57 • (DUP) R3273049-7 12/14/17 07:12

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	200	P1	15
Chloride	8.27	8.26	1	0		15
Fluoride	ND	0.0349	1	0	J	15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273049-2 12/14/17 02:52 • (LCSD) R3273049-3 12/14/17 03:07

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromide	40.0	40.0	40.0	100	99.9	80-120			0.183	15
Chloride	40.0	39.7	39.7	99.3	99.3	80-120			0.0818	15
Fluoride	8.00	8.03	8.03	100	100	80-120			0.0237	15

L957015-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957015-02 12/14/17 04:05 • (MS) R3273049-5 12/14/17 04:33 • (MSD) R3273049-6 12/14/17 04:48

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	48.9	44.4	97.8	88.8	1	80-120			9.59	15
Chloride	50.0	52.0	106	97.2	107	90.4	1	80-120	E		8.23	15
Fluoride	5.00	0.585	5.96	5.35	107	95.4	1	80-120			10.7	15

L957175-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L957175-01 12/14/17 06:57 • (MS) R3273049-8 12/14/17 07:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50.0	8.27	60.9	105	1	80-120	
Fluoride	5.00	ND	5.29	105	1	80-120	

Method Blank (MB)

(MB) R3273350-1 12/15/17 08:48

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.000049	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273350-2 12/15/17 08:50 • (LCSD) R3273350-3 12/15/17 08:52

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	0.00288	0.00270	96	89.9	80-120			6.55	20

L957143-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957143-02 12/15/17 08:55 • (MS) R3273350-4 12/15/17 08:57 • (MSD) R3273350-5 12/15/17 08:59

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	ND	0.00289	0.00279	96.4	92.9	1	75-125			3.73	20

Method Blank (MB)

(MB) R3273188-1 12/14/17 20:37

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury,Dissolved	0.000103	J	0.000049	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273188-2 12/14/17 20:39 • (LCSD) R3273188-3 12/14/17 20:42

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	0.00303	0.00301	101	100	80-120			0.652	20

L957143-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957143-02 12/14/17 20:44 • (MS) R3273188-4 12/14/17 20:46 • (MSD) R3273188-5 12/14/17 20:48

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	ND	0.00294	0.00297	98.1	99.1	1	75-125			0.998	20

Method Blank (MB)

(MB) R3273170-1 12/14/17 18:24

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Mercury	0.00699	J	0.0028	0.0200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273170-2 12/14/17 18:27 • (LCSD) R3273170-3 12/14/17 18:29

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.300	0.287	0.281	95.6	93.6	80-120			2.21	20

L957145-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957145-01 12/14/17 18:32 • (MS) R3273170-4 12/14/17 18:34 • (MSD) R3273170-5 12/14/17 18:44

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.300	0.105	0.390	0.248	95	47.4	1	75-125		J3 J6	44.8	20

Method Blank (MB)

(MB) R3273183-1 12/14/17 23:35

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Aluminum	U		3.5	10.0
Antimony	U		0.75	2.00
Arsenic	U		0.65	2.00
Barium	U		0.17	0.500
Beryllium	U		0.07	0.200
Boron	U		1.26	10.0
Cadmium	U		0.07	0.500
Calcium	U		4.63	100
Chromium	U		0.14	1.00
Cobalt	U		0.23	1.00
Copper	U		0.53	2.00
Iron	U		1.41	10.0
Lead	U		0.19	0.500
Magnesium	1.18	J	1.11	100
Manganese	U		0.12	1.00
Nickel	U		0.49	2.00
Potassium	U		10.2	100
Selenium	U		0.74	2.00
Silver	U		0.28	1.00
Sodium	U		9.85	100
Thallium	U		0.65	2.00
Vanadium	U		0.24	2.00
Zinc	U		0.59	5.00

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273183-2 12/14/17 23:38 • (LCSD) R3273183-3 12/14/17 23:41

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	1000	1040	1050	104	105	80-120			0.847	20
Antimony	100	101	102	101	102	80-120			0.648	20
Arsenic	100	104	104	104	104	80-120			0.471	20
Barium	100	108	108	108	108	80-120			0.529	20
Beryllium	100	107	107	107	107	80-120			0.382	20
Boron	100	102	103	102	103	80-120			1.19	20
Cadmium	100	101	101	101	101	80-120			0.832	20
Calcium	1000	1030	1030	103	103	80-120			0.277	20
Chromium	100	102	103	102	103	80-120			0.149	20
Cobalt	100	106	106	106	106	80-120			0.201	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3273183-2 12/14/17 23:38 • (LCSD) R3273183-3 12/14/17 23:41

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Copper	100	104	104	104	104	80-120			0.0151	20
Iron	1000	1040	1040	104	104	80-120			0.219	20
Lead	100	102	103	102	103	80-120			0.375	20
Magnesium	1000	1060	1060	106	106	80-120			0.574	20
Manganese	100	101	102	101	102	80-120			0.186	20
Nickel	100	104	105	104	105	80-120			0.226	20
Potassium	1000	1030	1040	103	104	80-120			0.542	20
Selenium	100	100	101	100	101	80-120			0.526	20
Silver	20.0	18.4	18.3	91.8	91.5	80-120			0.315	20
Sodium	1000	1030	1030	103	103	80-120			0.467	20
Thallium	100	101	102	101	102	80-120			0.262	20
Vanadium	100	104	104	104	104	80-120			0.266	20
Zinc	100	104	104	104	104	80-120			0.162	20

L957237-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957237-02 12/14/17 23:44 • (MS) R3273183-6 12/14/17 23:54 • (MSD) R3273183-7 12/14/17 23:57

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	1000	12700	20800	19600	813	693	1	75-125	V	V	5.94	20
Antimony	100	ND	46.0	43.7	46	43.7	1	75-125	J6	J6	4.99	20
Arsenic	100	4.04	95.6	96.5	91.6	92.5	1	75-125			0.913	20
Barium	100	18.6	124	123	105	105	1	75-125			0.0396	20
Beryllium	100	ND	96.2	97.4	96.1	97.3	1	75-125			1.24	20
Boron	100	ND	83.9	83.9	83.9	83.9	1	75-125			0.044	20
Cadmium	100	ND	90.9	91.7	90.9	91.7	1	75-125			0.886	20
Calcium	1000	ND	943	950	91.9	92.6	1	75-125			0.72	20
Chromium	100	27.2	120	124	93.1	96.3	1	75-125			2.63	20
Cobalt	100	ND	101	102	100	101	1	75-125			0.867	20
Copper	100	4.71	104	104	99.3	99.7	1	75-125			0.372	20
Iron	1000	17200	18500	18300	124	104	1	75-125			1.12	20
Lead	100	5.91	103	103	97	97.5	1	75-125			0.574	20
Magnesium	1000	212	1290	1270	107	106	1	75-125			1.26	20
Manganese	100	45.3	141	140	96.2	94.4	1	75-125			1.27	20
Nickel	100	5.29	107	107	102	102	1	75-125			0.16	20
Potassium	1000	383	1500	1480	112	110	1	75-125			1.57	20
Selenium	100	ND	88.9	90.4	88.9	90.4	1	75-125			1.67	20
Silver	20.0	ND	16.9	17.0	84.5	85.1	1	75-125			0.634	20
Sodium	1000	ND	940	949	91.4	92.3	1	75-125			1	20

L957237-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957237-02 12/14/17 23:44 • (MS) R3273183-6 12/14/17 23:54 • (MSD) R3273183-7 12/14/17 23:57

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Thallium	100	ND	91.0	91.7	91	91.7	1	75-125			0.709	20
Vanadium	100	36.8	131	132	93.9	94.9	1	75-125			0.738	20
Zinc	100	10.4	109	109	99	98.9	1	75-125			0.146	20

Method Blank (MB)

(MB) R3274308-1 12/19/17 16:43

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Boron,Dissolved	U		0.0126	0.200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274308-2 12/19/17 16:46 • (LCSD) R3274308-3 12/19/17 16:49

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Boron,Dissolved	1.00	0.975	0.994	97.5	99.4	80-120			1.91	20

L958177-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L958177-02 12/19/17 16:53 • (MS) R3274308-5 12/19/17 16:59 • (MSD) R3274308-6 12/19/17 17:02

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Boron,Dissolved	1.00	ND	1.00	1.01	100	101	1	75-125			0.965	20

Method Blank (MB)

(MB) R3274323-1 12/19/17 16:27

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	0.0194	J	0.0126	0.200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274323-2 12/19/17 16:29 • (LCSD) R3274323-3 12/19/17 16:32

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Boron	1.00	1.01	0.955	101	95.5	80-120			5.34	20

L957143-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957143-01 12/19/17 16:35 • (MS) R3274323-5 12/19/17 16:40 • (MSD) R3274323-6 12/19/17 16:42

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1.00	ND	0.995	1.01	97.2	98.2	1	75-125			0.973	20

Method Blank (MB)

(MB) R3274363-2 12/19/17 18:55

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum,Dissolved	0.00832	J	0.00515	0.100
Antimony,Dissolved	U		0.000754	0.00200
Arsenic,Dissolved	U		0.00025	0.00200
Barium,Dissolved	U		0.00036	0.00500
Beryllium,Dissolved	U		0.00012	0.00200
Cadmium,Dissolved	U		0.00016	0.00100
Calcium,Dissolved	U		0.046	1.00
Chromium,Dissolved	0.000668	J	0.00054	0.00200
Copper,Dissolved	0.000642	J	0.00052	0.00500
Cobalt,Dissolved	U		0.00026	0.00200
Iron,Dissolved	U		0.015	0.100
Lead,Dissolved	U		0.00024	0.00200
Magnesium,Dissolved	U		0.1	1.00
Manganese,Dissolved	0.000863	J	0.00025	0.00500
Nickel,Dissolved	0.000547	J	0.00035	0.00200
Potassium,Dissolved	U		0.037	1.00
Selenium,Dissolved	U		0.00038	0.00200
Silver,Dissolved	U		0.00031	0.00200
Sodium,Dissolved	U		0.11	1.00
Thallium,Dissolved	U		0.00019	0.00200
Vanadium,Dissolved	0.000544	J	0.00018	0.00500
Zinc,Dissolved	U		0.00256	0.0250

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274363-3 12/19/17 18:58 • (LCSD) R3274363-4 12/19/17 19:02

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	5.48	5.25	110	105	80-120			4.21	20
Antimony,Dissolved	0.0500	0.0552	0.0544	110	109	80-120			1.44	20
Arsenic,Dissolved	0.0500	0.0537	0.0528	107	106	80-120			1.75	20
Barium,Dissolved	0.0500	0.0498	0.0475	99.6	95	80-120			4.75	20
Beryllium,Dissolved	0.0500	0.0480	0.0467	96	93.4	80-120			2.8	20
Cadmium,Dissolved	0.0500	0.0494	0.0480	98.8	96.1	80-120			2.76	20
Calcium,Dissolved	5.00	5.18	4.99	104	99.8	80-120			3.67	20
Chromium,Dissolved	0.0500	0.0520	0.0509	104	102	80-120			2.17	20
Copper,Dissolved	0.0500	0.0553	0.0534	111	107	80-120			3.57	20
Cobalt,Dissolved	0.0500	0.0526	0.0516	105	103	80-120			1.9	20
Iron,Dissolved	5.00	5.46	5.31	109	106	80-120			2.82	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274363-3 12/19/17 18:58 • (LCSD) R3274363-4 12/19/17 19:02

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead,Dissolved	0.0500	0.0516	0.0500	103	100	80-120			3.07	20
Magnesium,Dissolved	5.00	5.34	5.15	107	103	80-120			3.65	20
Manganese,Dissolved	0.0500	0.0509	0.0497	102	99.4	80-120			2.48	20
Nickel,Dissolved	0.0500	0.0529	0.0522	106	104	80-120			1.35	20
Potassium,Dissolved	5.00	5.37	5.19	107	104	80-120			3.42	20
Selenium,Dissolved	0.0500	0.0505	0.0484	101	96.9	80-120			4.24	20
Silver,Dissolved	0.0500	0.0504	0.0495	101	99.1	80-120			1.8	20
Sodium,Dissolved	5.00	5.34	5.15	107	103	80-120			3.53	20
Thallium,Dissolved	0.0500	0.0526	0.0507	105	101	80-120			3.65	20
Vanadium,Dissolved	0.0500	0.0505	0.0496	101	99.3	80-120			1.78	20
Zinc,Dissolved	0.0500	0.0530	0.0520	106	104	80-120			1.83	20

L957195-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957195-01 12/19/17 19:06 • (MS) R3274363-6 12/19/17 19:13 • (MSD) R3274363-7 12/19/17 19:17

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum,Dissolved	5.00	U	5.38	5.24	108	105	1	75-125			2.49	20
Antimony,Dissolved	0.0500	0.00112	0.0582	0.0558	114	109	1	75-125			4.16	20
Arsenic,Dissolved	0.0500	0.0142	0.0667	0.0645	105	101	1	75-125			3.29	20
Barium,Dissolved	0.0500	0.106	0.156	0.154	99.3	96.2	1	75-125			0.995	20
Beryllium,Dissolved	0.0500	U	0.0474	0.0452	94.8	90.5	1	75-125			4.64	20
Cadmium,Dissolved	0.0500	U	0.0509	0.0486	102	97.1	1	75-125			4.62	20
Calcium,Dissolved	5.00	95.7	102	101	121	114	1	75-125			0.351	20
Chromium,Dissolved	0.0500	U	0.0506	0.0483	101	96.7	1	75-125			4.46	20
Copper,Dissolved	0.0500	0.00176	0.0529	0.0503	102	97.1	1	75-125			5.04	20
Cobalt,Dissolved	0.0500	0.000367	0.0513	0.0484	102	96	1	75-125			5.93	20
Potassium,Dissolved	5.00	17.8	23.1	23.1	105	107	1	75-125			0.32	20
Iron,Dissolved	5.00	U	5.33	5.06	107	101	1	75-125			5.05	20
Lead,Dissolved	0.0500	0.000326	0.0519	0.0496	103	98.5	1	75-125			4.57	20
Magnesium,Dissolved	5.00	40.5	45.7	45.6	106	102	1	75-125			0.378	20
Manganese,Dissolved	0.0500	0.0884	0.137	0.134	98.1	91.4	1	75-125			2.44	20
Nickel,Dissolved	0.0500	0.00315	0.0532	0.0512	100	96.2	1	75-125			3.86	20
Silver,Dissolved	0.0500	U	0.0498	0.0474	99.7	94.9	1	75-125			4.95	20
Sodium,Dissolved	5.00	110	115	115	89.1	102	1	75-125			0.563	20
Thallium,Dissolved	0.0500	U	0.0530	0.0508	106	102	1	75-125			4.23	20
Vanadium,Dissolved	0.0500	0.00185	0.0520	0.0499	100	96	1	75-125			4.27	20
Zinc,Dissolved	0.0500	0.00332	0.0519	0.0491	97.2	91.7	1	75-125			5.47	20

Method Blank (MB)

(MB) R3274036-1 12/18/17 21:27

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	U		0.00515	0.100
Antimony	U		0.000754	0.00200
Arsenic	U		0.00025	0.00200
Barium	U		0.00036	0.00500
Beryllium	U		0.00012	0.00200
Cadmium	U		0.00016	0.00100
Calcium	U		0.046	1.00
Chromium	U		0.00054	0.00200
Copper	U		0.00052	0.00500
Cobalt	U		0.00026	0.00200
Iron	U		0.015	0.100
Lead	0.000302	J	0.00024	0.00200
Magnesium	U		0.1	1.00
Manganese	U		0.00025	0.00500
Nickel	U		0.00035	0.00200
Potassium	U		0.037	1.00
Selenium	U		0.00038	0.00200
Silver	U		0.00031	0.00200
Sodium	U		0.11	1.00
Thallium	U		0.00019	0.00200
Vanadium	0.000319	J	0.00018	0.00500
Zinc	U		0.00256	0.0250

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274036-2 12/18/17 21:31 • (LCSD) R3274036-3 12/18/17 21:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	4.85	4.85	97.1	97	80-120			0.0783	20
Antimony	0.0500	0.0542	0.0543	108	109	80-120			0.152	20
Arsenic	0.0500	0.0508	0.0510	102	102	80-120			0.457	20
Barium	0.0500	0.0476	0.0485	95.2	96.9	80-120			1.79	20
Beryllium	0.0500	0.0490	0.0489	97.9	97.8	80-120			0.0849	20
Cadmium	0.0500	0.0484	0.0483	96.9	96.6	80-120			0.239	20
Calcium	5.00	4.95	4.99	99.1	99.7	80-120			0.634	20
Chromium	0.0500	0.0507	0.0507	101	101	80-120			0.0485	20
Copper	0.0500	0.0525	0.0519	105	104	80-120			1.02	20
Cobalt	0.0500	0.0520	0.0520	104	104	80-120			0.123	20
Iron	5.00	5.11	5.12	102	102	80-120			0.172	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3274036-2 12/18/17 21:31 • (LCSD) R3274036-3 12/18/17 21:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead	0.0500	0.0495	0.0495	98.9	99	80-120			0.0341	20
Magnesium	5.00	5.14	5.13	103	103	80-120			0.0639	20
Manganese	0.0500	0.0489	0.0493	97.7	98.7	80-120			0.988	20
Nickel	0.0500	0.0519	0.0518	104	104	80-120			0.304	20
Potassium	5.00	5.18	5.21	104	104	80-120			0.616	20
Selenium	0.0500	0.0494	0.0493	98.7	98.6	80-120			0.168	20
Silver	0.0500	0.0508	0.0509	102	102	80-120			0.185	20
Sodium	5.00	5.10	5.08	102	102	80-120			0.424	20
Thallium	0.0500	0.0494	0.0499	98.8	99.8	80-120			0.993	20
Vanadium	0.0500	0.0493	0.0496	98.7	99.2	80-120			0.51	20
Zinc	0.0500	0.0512	0.0522	102	104	80-120			1.89	20

L957205-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L957205-02 12/18/17 21:39 • (MS) R3274036-5 12/18/17 21:46 • (MSD) R3274036-6 12/18/17 21:50

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	ND	5.06	4.96	99.7	97.9	1	75-125			1.88	20
Antimony	0.0500	ND	0.0571	0.0558	114	112	1	75-125			2.27	20
Arsenic	0.0500	0.00380	0.0543	0.0529	101	98.1	1	75-125			2.6	20
Barium	0.0500	0.0218	0.0723	0.0712	101	98.8	1	75-125			1.57	20
Beryllium	0.0500	ND	0.0496	0.0489	99.3	97.9	1	75-125			1.43	20
Cadmium	0.0500	ND	0.0531	0.0514	106	103	1	75-125			3.29	20
Calcium	5.00	88.7	95.5	93.4	135	93.9	1	75-125	V		2.19	20
Chromium	0.0500	ND	0.0523	0.0513	102	99.8	1	75-125			1.77	20
Copper	0.0500	0.00810	0.0585	0.0573	101	98.3	1	75-125			2.21	20
Cobalt	0.0500	ND	0.0517	0.0504	103	101	1	75-125			2.55	20
Potassium	5.00	8.33	13.6	13.5	105	103	1	75-125			0.792	20
Iron	5.00	0.193	5.30	5.20	102	100	1	75-125			1.89	20
Lead	0.0500	ND	0.0519	0.0509	103	101	1	75-125			1.83	20
Magnesium	5.00	21.9	27.1	26.9	104	100	1	75-125			0.763	20
Manganese	0.0500	0.0116	0.0612	0.0603	99.1	97.5	1	75-125			1.4	20
Nickel	0.0500	ND	0.0512	0.0496	101	97.6	1	75-125			3.03	20
Selenium	0.0500	0.0479	0.104	0.103	112	110	1	75-125			0.708	20
Silver	0.0500	ND	0.0510	0.0498	102	99.6	1	75-125			2.35	20
Sodium	5.00	503	512	508	166	96.1	1	75-125	V		0.684	20
Thallium	0.0500	ND	0.0522	0.0516	104	103	1	75-125			1.08	20
Vanadium	0.0500	0.00603	0.0582	0.0567	104	101	1	75-125			2.49	20
Zinc	0.0500	ND	0.0532	0.0481	106	96.1	1	75-125			10.2	20

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
V	The sample concentration is too high to evaluate accurate spike recoveries.

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.**
***** Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina [1]	DW21704
Florida	E87487	North Carolina [2]	41
Georgia	NELAP	North Dakota	R-140
Georgia [1]	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky [1]	90010	South Dakota	n/a
Kentucky [2]	16	Tennessee [1 4]	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

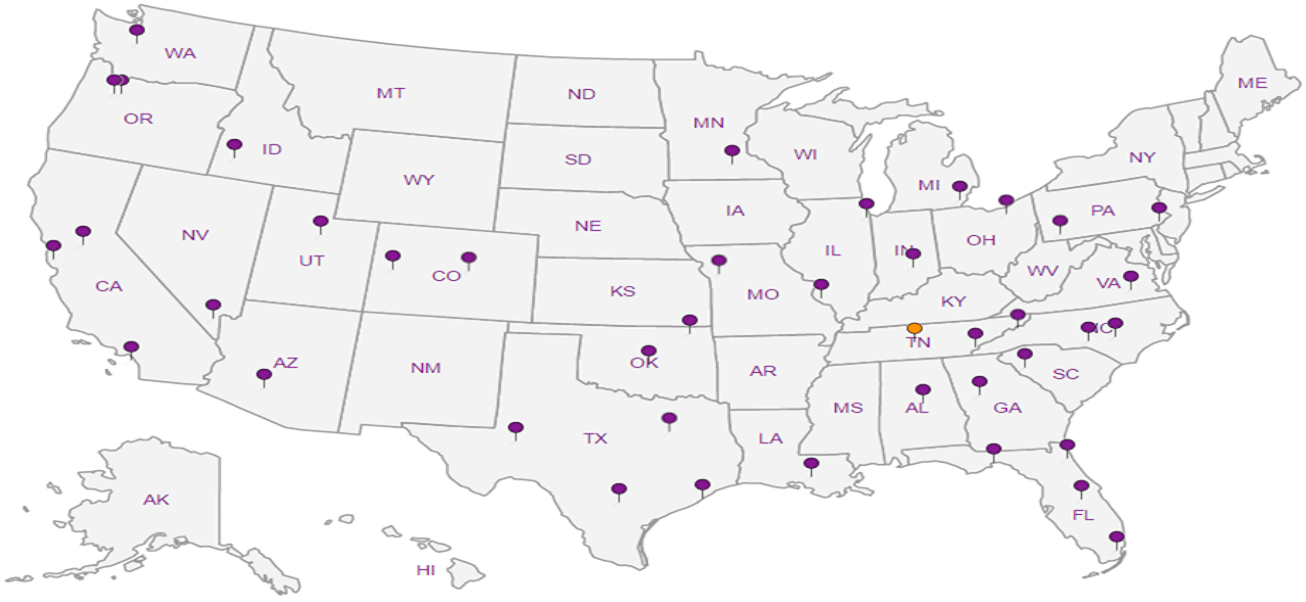
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [n/a] Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Report to: **Philip Campbell**

Email To: **mjohnson@cecinc.com,pcampbell@cecinc.com,kcl**

Project Description: **EWS Landfill**

City/State Collected:

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **142-059**

Lab Project # **CEC-142-059**

Collected by (print): Cole Liggett, Caleb Dike

Site/Facility ID #

P.O. #

Collected by (signature): Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Bromide, Cl, F 125mlHDPE-NoPres	Bromide, Cl, F 4ozClr-NoPres	Diss. Metals 250mlHDPE-NoPres	NH3 125mlHDPE-H2SO4	Total Metals + HARD 250mlHDPE-HNO3	Total Metals 2ozClr-NoPres	Total Metals+ HARD 250mlHDPE-HNO3				Remarks	Sample # (lab only)
CHARLIE CREEK US	Grab	GW		12-11-17	2:00	4	X		X	X	X							-01
CHARLIE CREEK MS		GW			12:50	4	X		X	X			X					-02
CANE CREEK US		GW			1:30	4	X		X	X	X							-03
CANE CREEK MS		GW			12:10	4	X		X	X	X							-04
CANE CREEK DS-1		GW			11:35	4	X		X	X	X							-05
CHARLIE CREEK US		SS			2:00	2		X				X						-06
CHARLIE CREEK MS		SS			12:50	2		X				X						-07
CANE CREEK US		SS			1:30	2		X				X						-08
CANE CREEK MS		SS			12:10	2		X				X						-09
CANE CREEK DS-1		SS			11:35	2		X				X						-10

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____
Flow _____ Other _____

Samples returned via: __ UPS __ FedEx __ Courier X CAR

Tracking #

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Philip Campbell	12-12-17	18:00	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature) 803

Trip Blank Received: Yes / No HCL / MeoH TBR

Temp: 3.1 °C Bottles Received: 30

Date: 12/13/17 Time: 0845

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

If preservation required by Login: Date/Time

Hold: Condition: NCF / OK

Chain of Custody Page ___ of ___

ESC LABORATORY SCIENCES
a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 957175
B047

Acctnum: CEC
Template: T128179
Prelogin: P628650
TSR: 341 - John Hawkins
PB: HS 11-29-17

Shipped Via: FedEX Ground

APPENDIX D
CEC STANDARD OPERATING PROCEDURES

03-02-01 MONITORING WELLS USING CONVENTIONAL PURGING

I. SCOPE AND APPLICABILITY: This procedure is applicable to the sampling of monitoring wells which do not contain free product using conventional purge methodology.

II. PROJECT-SPECIFIC REQUIREMENTS

A. SAMPLE LOCATIONS AND NUMBERING SYSTEM:

B. ANALYTICAL PARAMETERS AND SAMPLE FREQUENCY:

C. FIELD SCREENING AND ANALYSES: *Reference appropriate SOPs.*

D. QUALITY ASSURANCE SAMPLES: *Number and type of blanks and duplicates. Reference SOPs 04-01-01, 04-01-02, and 04-02-01 as appropriate.*

E. FILTRATION:

F. PURGE CRITERION AND DISPOSAL OF PURGE WATER:

G. WELL KEYS: *Indicate whether wells use CEC's standard key*

H. DEDICATED EQUIPMENT: *Indicate whether dedicated pumps or bailers have been installed.*

I. OTHER REQUIREMENTS:

III. METHODOLOGY: Monitoring wells should be sampled progressing from least contaminated to most contaminated to reduce the chances of cross contamination between samples. If a bailer is employed, use new rope for each well.

A. PURGING: Purging is performed to remove static water standing in the well bore, thereby allowing collection of a sample representative of water in the aquifer. Unless otherwise specified in Section II.F., well development may suffice for the purge, so long as the sample is collected immediately following development.

1. Measure the water level from the top of the riser pipe at the pre-marked reference point (SOP 06-01-01).

2. Calculate the purge volume using the data presented in Exhibit 03-02-01 and the criterion presented in Section II.F.

3. Remove the required volume of water using one of the following methods. If the well goes dry, the purge can be considered complete unless otherwise specified in Section II.F. However, attempts should be made to prevent the well from going dry during purging, drying the well disrupts the flow regime and can result in the loss of volatile compounds. Therefore:

≅ If a well is known to have a low yield, it should be purged by bailing.

≅ If a pump is used for purging, adjust the pumping rate to maintain a water column in the well, if possible.

≅ Do not attempt to purge a well to dryness unless it is infeasible to maintain water in the well at a reasonable purge rate.

METHOD A: If the purge criterion is specified on volume of water to be removed:

a. Remove the required volume of water using a submersible pump or bailer. If a pump is used, a check valve must be installed on the pump to prevent pumped water from returning to the well. Begin purging at the top of the water column. Minimize aeration of the water during purging by pumping at a low rate or lowering the bailer gently into the water.

b. Lower the pump or bailer as necessary to continue purging until the well volume criterion is met.

METHOD B: If the purge criteria are specified on stabilization of field analyses:

a. Measure initial water quality by retrieving a sample from the top of the water column using a bailer. Conduct the field analyses specified in Section II.F. Record these results on the Groundwater Monitoring Data Sheet (SOP 07-02-01).

b. Remove one well volume of water by submersible pump or bailer. If a pump is used, a check valve must be installed to prevent water from returning to the well. Begin purging at the top of the water column. Minimize aeration of the water during purging by pumping at a low rate or lowering the bailer gently into the water.

c. After one well volume has been removed, conduct field analyses on the groundwater being discharged. Record results on the Monitoring Sampling Data Sheet.

d. Repeat steps b and c until the purge criteria have been met.

B. SAMPLE COLLECTION: Groundwater samples should be collected immediately after purging , if the well will yield sufficiently. Some low-yielding wells may require time to recover prior to sampling. If the well will not yield a sample immediately after purging, a maximum of 24 hours between purging and sampling is permitted.

1. Collect water from the well by slowly lowering a decontaminated bailer into the water column.

2. Transfer the samples which do not require filtering directly into sample bottles in the following order:

Volatile Organic Compounds
Semi-Volatile Organic Compounds
Pesticides and PCBs
Cations and Anions
Radionuclides
Bacteria.

3. If indicated in Section II.E., filter the required aliquots (SOP 05-03-02 or 05-03-03) and fill those sample bottles.

4. Preserve the samples immediately in accordance with SOP 07-01-02.

5. Conduct field analyses: pH (SOP 05-04-01 or 05-04-04), temperature, specific conductance (SOP 05-04-02), dissolved oxygen (SOP 05-04-03), Eh (SOP 05-04-08), and any other parameters listed in Section II.C.

6. If a dedicated sample bailer was used, return it to the well head. Otherwise, decontaminate the bailer as specified in SOP 01-01-00.

7. Replace the well cap and lock the protective casing.

8. Collect quality-assurance samples specified in Section II.D in accordance with SOP 04-01-01, 04-01-02, and 04-02-01.

9. Decontaminate samples in accordance with SOP 01-01-00.

10. Pack and ship the samples in accordance with SOP 07-01-03. Samples should be shipped on a daily basis and such that holding time requirements (SOP 07-01-02) can be met.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. When using a bailer, do not allow the rope to drag on the ground. If necessary, lay out plastic sheeting to catch the rope.

B. When using a pump, exercise caution to prevent cross-contaminating samples with the hose. Do not sample from the pump discharge for trace organic compounds. Always use a check valve if not using a dedicated hose. Discard hose if there is a question about whether it can be adequately decontaminated.

C. Check the holding times on the analyses to be conducted. The holding time for some parameters is 24 hours. Plan sampling and shipping of these samples accordingly.

D. Preserve samples immediately after collection, including keeping them cool. Do not let samples sit in a hot vehicle until the end of the day.

V. DOCUMENTATION

A. Record information on a Groundwater Monitoring Data Sheet (SOP 07-02-01).

B. Prepare a Trip Report (SOP 07-02-04) and include:

- ≅ Time, date, and method of sample shipment
- ≅ Preservation methods and sample handling
- ≅ Description of purge and sampling methods
- ≅ The Groundwater Monitoring Data Sheet.

VII. REFERENCES

None

04-01-01 FIELD BLANKS

I. SCOPE AND APPLICABILITY

The purpose of a blank in general is to evaluate artificially introduced sources of contamination. Field blanks are part of a continuum of blank types that may be used to monitor for contamination introduced throughout the life span of a sample from collection through to analysis (see Exhibit 1). Examples of field blanks include equipment blanks, lot checks of dedicated sampling equipment, bottle blanks, transfer blanks, decontamination/rinsate source blanks and trip blanks (see 04-01-02).

A. Equipment Blanks are collected to assess the adequacy of decontamination procedures for non-dedicated sampling equipment and may help evaluate whether field conditions, and/or sampling equipment, sample transport, preparation and/or analysis are contributing contaminants to samples. Equipment blanks are typically performed on non-dedicated sampling equipment that requires decontamination between uses. Equipment blanks should not be collected near running machinery which may emit fumes that can contaminate the blanks
.

B. Lot Checks are rinsates of disposable sampling equipment analyzed for the target analytes of interest that are sampled using that equipment. This may include peristolic tubing, sampling scoops or bailers as well as the empty bottles provided by the laboratory if there are concerns with their purity.

C. Transfer Blanks are empty sample containers filled with water in the field to monitor for ambient contamination - they most typically are used for aqueous samples for organics such as volatiles, GRO, and DRO but may also be useful if airborne particulates are of concern for inorganic parameters. The water source should be the same as what will be used for the final rinse of decontaminated field equipment (see 04-04-01).

D. Decontamination/Rinsate Source Blanks are samples created from the source of final rinsate water used in the field. They differ from Transfer Blanks in that they would typically be filled in a "clean" location as opposed to the field to avoid picking up unexpected ambient contamination. This type of blank, while rare, typically is utilized when an unexplained and persistent contaminant has been detected in the equipment blanks and all other potential sources of contamination have been eliminated as the source.

II. PROJECT-SPECIFIC REQUIREMENTS

WATER TYPES TO BE USED FOR BLANKS: Blank water refers to water that is free of any analytes of interest. Common water types include distilled, deionized, HPLC-grade, pesticide grade etc. Depending on the data quality objectives for the project and expected levels of target analytes, the choice of water used for field blanks water may vary. Investigations where trace levels (parts per billion or lower) of contaminant are of interest may require water that meets higher purity standards than soil investigations where target analytes may be in the parts per million range.

Sources of water suitable for use for field blanks include:

A. **Laboratory supplied water** is laboratory reagent water that is used in the analytical or cleaning processes, as well as for their method blanks. For the best comparability between field blanks and laboratory method or instrument blanks it is recommended that laboratory supplied water be used. This water should be in glass containers if organics analytes are of interest. In addition, this water should be from the laboratory performing the analyses and not left over from a prior investigation or from a different laboratory. This eliminates any variability introduced as a result of different blank water sources. Left over water from a previous project is not recommended for use as a field blank as the possibility exists that the water could have become contaminated during storage.

B. **Store purchased distilled/deionized**: If trace level analyses are not required, the use of commercially prepared distilled/deionized water purchased from a supermarket or home improvement store may be sufficient. As this water typically is available in plastic jugs, it is not an appropriate blank water source when trace level organics are the constituents of interest.

C. **Ultra Pure**: Certified metal-grade, pesticide-grade or HPLC-grade water may be purchased from most chemical supply companies.

III. METHODOLOGY

A. Review the SOP for the medium sampled, the project specific field sampling plan or quality assurance project plan to determine the blank collection frequency required for the project. Due to cost or other considerations, every project may not warrant the use of an equipment blank. Considerations impacting the frequency of equipment blank collection may include expected concentration ranges of the analytes of interest, field conditions (i.e. will sampling activities occur in an area where there are potential background ambient concentrations of target analytes), use of new sampling equipment, newly trained staff, or use of an unknown laboratory. Field blanks may also be collected if unexpected results in field samples are observed.

B. Record the source, date opened and lot number of the water used for the rinsate blanks.

C. Assemble a complete set of decontaminated sampling equipment for the subject sampling effort.

D. Rinse the blank water across the sampling equipment, catching it in a decontaminated stainless-steel bucket or bowl. Handle the water in the same manner as the samples. For example, if samples for metals analysis are to be filtered with a disposable filter, the blank aliquot for metals analysis should be processed through a new disposable filter. Blanks for soil sampling may be run across the split-spoon sampler, trowel, and bucket and/or bowl used for homogenizing.

E. Fill a complete set of sample bottles.

F. Assign the blank a sample id – if it is desirable to obscure the fact that the sample is a blank, use the same format as the other samples in the series, otherwise a simplified sample id such as FB-mmddyy is recommended (where FB could be EB, TRB, LC etc. as appropriate for the blank type).

G. Assign the blank a sample date and time. Laboratory protocols for assigning sampling date/time to improperly labeled samples vary widely and may impact sampling holding times for certain short hold parameters.

H. Include the blanks on the Chain of Custody form along with the other samples.

I. Store, handle, and ship the blanks in the same manner as the samples.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. The selection of stock blank water depends upon the requirements of the project. Analyses for trace contaminants will require a purer blank solution than analyses for major constituents. Stringent analytical requirements will necessitate the use of laboratory-supplied blank water.

B. Include ALL sampling equipment in the rinsing procedure.

V. DOCUMENTATION: Record the following information in the field logbook:

- Source of blank water (include a lot number if available and the type of sample container)
- Time and sequence within the sampling event when the blanks were prepared

- Description of the procedure for preparing the blanks
- Sample numbers assigned to blanks.

Incorporate this information into the Trip Report (SOP 06-02-05).

VI. REFERENCES

EPA, 1986. Test Methods for Evaluating Solid Waste: SW-846; Volume I, Chapter I. Washington, DC.
EPA, 2009. Region III Fact Sheet: Quality Control Tool – Blanks
(http://www.epa.gov/region3/esc/qa/pdf/blanks.pdf)

04-01-02 TRIP BLANKS

I. SCOPE AND APPLICABILITY

A trip blank is a container of laboratory reagent water that is prepared by the laboratory and shipped, unopened, to the field with empty sample containers and then from the field along with the full sample containers. Trip blanks are used to document contamination attributable to shipping and field handling procedures (i.e., diffusion of volatile organics through the septum during daily collection activities, shipment and storage) as well as provide an independent assessment of laboratory introduced contamination. If the trip blank and associated laboratory preparation blanks are free of analytes of interest, it may safely be assumed that reported analytes are actually present in the environmental samples.

II. PROJECT-SPECIFIC REQUIREMENTS

A. Frequency: *Specify the project specific frequency based on the Work Plan.*

B. Other Criteria: A trip blank is used for all classes of volatile organic analyte analyses (VOA), such as TCL volatile organic compounds (VOCs), BTEX, methanol or other purgeable organic compounds. If you are unsure whether a specific analysis is considered a purgeable method, confirm with the laboratory.

1. Trip blanks are also required for soil samples submitted for TPH-gasoline range organics and other purgeable organics analyses (VOAs). These trip blanks should be prepared in the same manner as an aqueous trip blank.
2. If some of the daily samples being collected/shipped together are submitted for typical VOCs (SW846-8260 or EPA 624) while others are submitted for TPH gasoline/diesel range organics (or another purgeable organic method), you will need to include 2 sets of trip blanks and analyze one for each unique (non-overlapping analyte list) method.

C. Other Considerations: Even if the project Work Plan doesn't specifically call for the use of Trip Blanks there are certain situations where the use of a Trip Blank should be evaluated:

1. If an unexpected high field PID reading is encountered during sampling, a trip blank may be warranted to monitor for cross contamination if other samples are included in the shipment.
2. When there is suspicion of the potential of airborne contamination from external sources such as idling vehicles or machinery or operations upwind using VOCs (such as a refinery, spray painting etc.) although such contamination is best monitored for using a transfer blank where the VOA vial is filled in the field with the water used for equipment rinsate blanks.
3. In general, if there is a suspicion of external cross contamination, a trip blank could be submitted to the laboratory to be placed on HOLD. If unexpected results are encountered in the other samples in the shipment, the laboratory can then be requested to analyze the trip blank to determine whether cross contamination has occurred however holding times must be closely monitored in such cases.

III. METHODOLOGY

For those projects where trip blanks are required, appropriate procedures are discussed below:

A. One trip blank should be included with each cooler containing volatile samples. To save on trip blank analysis costs, you may collect all volatile samples during the day in a single cooler and ship them separately from other sample bottles (if necessary to minimize the number of trip blanks required).

B. When ordering bottles from the laboratory for the sampling event, request sufficient trip blanks such that there is at least one trip blank associated with each day of sample collection activities (with a few spares as a contingency if unexpected conditions expand the field activities or a trip blank container breaks).

C. A trip blank is associated with a group of samples that are collected together throughout the day and shipped together. (It is not necessary to maintain the trip blanks with the same set(s) of vials that are shipped from the laboratory, unless there is a concern that these sample containers have potentially been exposed to contamination during shipment, when it is recommended that fresh containers be obtained.)

D. The trip blank should go out to the field in a cooler (with ice) that volatile field samples containers are added to as they are collected during each day's sampling activities. Handle the blank in the same manner as the filled sample vials.

E. Assign the trip blank a sample number identifying its source, consistent with the format used for the sampling event. One suggestion is to include the sample date in the sample number to aid in matching it with the associated field samples in presentation of results in the project report (i.e. TB0401 or TRIP0401 for the trip blank associated with samples collected on 04/01).

F. Assign a date and time to the trip blank on the COC and sample container as if it were a field sample. The time stamp for the trip blank is when the first sample is added to the cooler containing the trip blank. Do not leave this field blank as the laboratory will require a date and time stamp to monitor analysis holding times. Laboratory protocols for assigning this date if left blank can vary considerably.

G. Return the trip blanks to the laboratory with the samples. Include the trip blank information along with the samples on the Chain-of-Custody form (SOP 06-02-02). Analysis is performed for the same suite of volatile organic compounds as the associated samples. (i.e., it is only necessary to request BTEX if associated samples are only analyzed for BTEX). However, if samples with different subsets of volatile constituents are collected and shipped together, select the method that covers all of the constituents. It is not necessary to analyze for both BTEX and TCL VOCs, for example.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. Trip blanks should never be opened in the field.

B. If there are multiple sample teams on the project that are collecting samples separately from each other during the day, a separate trip blank should be assigned to each group which is then shipped separately to the lab.

C. Do not combine groupings of samples with different associated trip blanks into the same cooler for shipping.

D. Do not combine multiple days' worth of VOC samples into a cooler for shipment unless they have been in the same cooler with the trip blank and each other throughout the sampling process.

V. DOCUMENTATION

Describe handling of the trip blanks in the Trip Report (SOP 06-02-05). Include the sample numbers assigned and associated samples (if more than one trip blank is used).

VI. REFERENCES:

EPA, 1986. Test Methods for Evaluating Solid Waste: SW-846; Volume II. Washington, DC

EPA Region III Quality Control Fact Sheet, Field Blanks,
http://www.epa.gov/region3/esc/qa/pdf/blanks.pdf

05-03-05 BAILER

I. EQUIPMENT SPECIFICATION: This procedure is applicable to the use of all bottom-fill bailers.

II. INSPECTION AND CALIBRATION

A. DAILY INSPECTION AND CHECKS: Make sure fittings at both ends of the bailer are secure. Assure that the check valve opens and closes freely.

B. CALIBRATION: There is no calibration applicable to this equipment.

C. ROUTINE MAINTENANCE: There is no maintenance applicable to this equipment. Bailers are typically replaced if damaged.

III. USE

A. Select a rope or cable for suspension of the bailer which is appropriate to project requirements. Typically, small gauge nylon rope is used, although stainless-steel cable may be used when samples will be analyzed to very low detection limits. The rope or cable should be new and clean. Do not use materials which have been used on another project, as this may result in cross contamination.

B. Consult the Project Manager to select a bailer composition which is compatible with the anticipated groundwater quality. For most applications, PVC bailers are adequate. Stainless-steel may be used where very low levels of organic compounds are of interest. Teflon bailers are available and may be requested on some projects.

C. Using a strong, non-slipping knot, such as a bowline, tie the rope or cable to the top of the bailer.

D. Lower the bailer into the well. Do not let the bailer free-fall down the well, as the device may shatter or the ball valve may become dislodged upon striking the water or the bottom of the well.

E. Raise the bailer by pulling the rope with a smooth, uniform motion. A jerky motion may open the check valve, resulting in water loss. Check the knot periodically.

Do not allow the bailer rope to drag on the ground. Place plastic sheeting on the ground to keep the rope clean if conditions are muddy, the ground surface is contaminated, or very low levels of contaminants are of interest.

IV. DECONTAMINATION: The equipment should be decontaminated in accordance with SOP 01-01-00.

Typically, the bailer is washed with a potable water and non-phosphate soap solution. The bailer is then rinsed with distilled water and wrapped in plastic or foil until used.

V. TROUBLESHOOTING

A. If the knot should come undone or the rope breaks, the bailer typically can be recovered using a weighted fishing hook tied to monofilament line.

B. When bailing turbid water, it may be necessary to rinse the ball-valve at the bottom of the bailer with distilled water if it clogs.

06-02-02 CHAIN-OF-CUSTODY FORM

I. SCOPE AND APPLICABILITY

A Chain-of-Custody (COC) Form must be completed for each shipment of samples for laboratory analysis. The COC form is the communication record between the project field team and the laboratory login personnel. Accurate and legible completion of the COC form is necessary to insure that samples are analyzed for the correct parameters.

II. PROJECT-SPECIFIC REQUIREMENTS: None.

III. METHODOLOGY

Complete a Chain-of-Custody Form as provided by the laboratory for each shipping container of samples containing the following information (each laboratory will have their own preferred COC form so the location of the information on the form may vary):

- CEC project number and name
- Project Manager or designated CEC contact with their phone number and email
- Date and time of sample collection
- Sample number
- Sample Matrix
- Total number of bottles or jars
- Preservation (this is especially important if the laboratory is expected to preserve the bottles upon receipt)
- Suites of analyses requested, in specific terms. Examples:
  TCL VOCs
  RCRA Metals
  BTEX
  PNAs-SW846 8270/SIM
  Avoid vague descriptors like "VOCs" or "metals." If a project specific analyte list (subset of metals or organic compounds for example) has been set up with the project and is referenced on the COC, include a copy of it with each shipment to the laboratory to ensure that it becomes part of the data report and the sample custody records. It should be possible to determine exactly what sample analyses were requested/required from the COC.
- Requested turnaround time (be specific (i.e. 48 hours, 3 days, etc.,) if not standard)
- Any special notes/requests, for example indicate high PID readings if applicable, request for lower reporting limits – don't assume you will get drinking water limits just because you submit a drinking water sample, this must be requested either in advance or on the COC
- Signature of CEC person relinquishing custody to the laboratory or shipping courier
- Date and time samples were handed over to someone else or placed under custody seals

Signatures of every person who has control of the samples should appear on the Chain-of-Custody Form. If another person, even another CEC employee, takes responsibility for packing or shipping the samples after you have completed the form and before the samples have been sealed, that person should sign as receiving and subsequently relinquishing the samples.

IV. PRECAUTIONS AND COMMON PROBLEMS

- Use of vague terms such as VOCs or Metals may lead to missing parameters. Verify with the laboratory which compounds/metals are part of their standard analyses to ensure that all necessary parameters will be reported.
- Illegible sample names/IDs will lead to the sample login personnel guessing/interpreting what was written which may result in the laboratory report not reflecting the intended sample names/ID. It is often not possible for the laboratory to retroactively edit the report and more importantly the

underlying analysis records to correct sample names/IDs.

- If lower reporting limits are required, this must be communicated to the laboratory on the COC in addition to any prior communication as this may impact how samples are logged in for analysis.

V. DOCUMENTATION

Use the laboratory supplied COC forms (paper or electronic) or equivalent. If three part forms are not used, either make a photocopy, take a photo of or fax the COC before placing it in the cooler. Use of the Chain-of-Custody Form is discussed in SOP 06-01-01 and SOP 06-01-03.

VI. REFERENCES: None.

07-02-01 GROUNDWATER MONITORING DATA SHEET

I. SCOPE AND APPLICABILITY: A Groundwater Monitoring Data Sheet is completed each time water samples are collected to document field data and sampling methodology.

II. PROJECT-SPECIFIC REQUIREMENTS: None.

III. METHODOLOGY: Complete the form (Exhibit 07-02-01) as samples are collected, as follows:

a. Self explanatory
b. CEC project number
c. Names or initials of all members of the sampling team
d. Complete well designation
e. Depth to water level, reported to $\pm$0.01 ft. (Check measurement datum at the top of the column.)
f. Date and time well purging is started
g. Volume of water removed, in gallons
h. Check if well was purged to dryness
i. Indicate method of purging, such as submersible pump or bailer
j. Date and time that the actual sample was withdrawn. If sample bottles were filled at multiple, separate times, these should all be indicated.
k. Self explanatory (Check units for temperature.)
l. Unusual odors or other observations
m. Other atypical information, such as special handling of purge water or field problems

IV. PRECAUTIONS AND COMMON PROBLEMS: All information required by the form must be provided.

V. DOCUMENTATION: Attach the form to the Trip Report (SOP 07-02-04).

VI. REFERENCES: None.